



United States Department of the Interior

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IN REPLY REFER TO:
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January 19, 2001

Memorandum

To: Regional Director, Mid-Pacific Region, Bureau of Reclamation, Sacramento, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Formal Consultation on the Central Valley Project (CVP) Water Contract Renewals for Friant and Cross Valley Division Contractors

This memorandum transmits the Fish and Wildlife Service (Service) biological opinion on the Service's review of proposed water service contract renewals for CVP Friant Division and Cross Valley Unit contractors. This opinion is provided in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.). Based upon our review of the project including the conservation measures, I have concluded that Reclamation's action to renew the water service contracts is not likely to jeopardize the continued existence of the species considered in this opinion.

Wayne S. White

Attachment

cc: ARD (ES) Portland, Oregon

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Introduction

Purpose of Consultation

This biological opinion has been prepared by the U.S. Fish and Wildlife Service (Service) to address the proposed renewal, by the U.S. Bureau of Reclamation (Reclamation), of water service contracts with the Friant Division and Cross Valley Units of the Central Valley Project (CVP) in accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA). These renewals will be consistent with Reclamation law including, but not limited to, section 3404(c) of the Central Valley Project Improvement Act (CVPIA), and will be for the 25 year period from 2001 through 2026. Water identified in these contracts will be placed to beneficial use within the Friant Division and Cross Valley Unit authorized place of use for agricultural, municipal, and industrial purposes. Maximum contract quantities remain unchanged and have been analyzed in existing biological opinions including the Friant biological opinion of 1991 (Friant opinion), the biological opinion on the Operational Criteria Plan for the CVP, March 6, 1995, and Interim Contract Renewal biological opinions (Interim opinions) completed in 1995, 1998, and 2000.

Opinion Summary and Conclusion

The description of the Proposed Action (starting on page 2-1) was developed collaboratively by Reclamation, representatives from the Friant Division and Cross Valley Unit (Applicants), and the Service and includes negotiated contract language and appropriate conservation commitments. The commitments and the *conservation measures* specified in section 2 of this document have been developed by Reclamation and the Service to conserve listed species and address impacts resulting from past and continuing actions related to renewal of these contracts, Section 7(a)(1) activities, and other authorities.

The Final Environmental Assessments (EA), National Environmental Policy Act (NEPA) documents, and the Biological Assessments (BA) prepared for this Proposed Action were also considered in this determination. To better assist Reclamation and the Service in planning and project implementation, the Service's SFWO Endangered Species Division provided guidance on implementation of the ESA which is an integral part of this opinion. The ESA guidance in this opinion is intended to be followed based on the effects to listed species. Any ancillary or exclusionary language from laws other than ESA should not be used to bear upon any effects determinations that are made relative to listed species.

Contract Items to be Handled Under Separate ESA Determinations

To reach a no jeopardy conclusion for this opinion the following actions, included in the long-term renewal contracts, are not covered by this opinion. These actions, as listed below, and any other action not described in the Project Description of this biological opinion, will require separate determinations regarding their potential effects on threatened and endangered species and critical habitat pursuant to section 7 and/or section 10 of the ESA.

- Any future assignments of Central Valley Project water involving Friant Division or Cross Valley Unit contractors
- Transfers and/or exchanges involving Friant Division or Cross Valley Unit contractors
- Inclusions and exclusions to Friant Division or Cross Valley Unit contract service area boundaries
- Warren Act contracts
- Surplus Flood Flow Water Contracts
- Future changes in purpose of use from Ag only to Ag/M&I involving Friant Division or Cross Valley Unit contractors
- Any changes in purpose of use
- Operation and Maintenance on Federal and District lands used to convey CVP water and implementation of the agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).
- Operation and Maintenance Plans
- Actions associated with the CVPIA Land Retirement Program in the Cross Valley Division
- Actions associated with the San Joaquin River Restoration Program
- New contracts
- Future contract renewals beyond the year 2026

The direct, indirect, and interrelated and interdependent effects of the action, and cumulative effects, are added to the environmental baseline that is evaluated together with the current status of the species or critical habitat to ascertain the likelihood of a given action jeopardizing the continued existence of the listed species or adversely modifying or destroying critical habitat under consideration. The environmental baseline includes past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of Federal actions that have undergone formal or early Section 7 consultation, and the impact of State and private activities that are contemporaneous with the consultation process. In examining the current status of a listed species, the Service considers the species needs, including its breeding, feeding, and sheltering requirements. Historical information is used where available to provide a perspective on geographic distribution and population levels and to project future trends. Recovery plans and goals are utilized to the extent that they are current and represent the best available scientific information.

Species Included in Consultation

This biological opinion covers 35 federally listed species, four proposed species, and three candidate species. Scientific names and the associated protection status of these species are listed in Table 1.1. With the exception of the following, all species were included in the 1991 Friant opinion or subsequent Interim opinions or amendments: California condor, Buena Vista lake shrew, California red-legged frog, California tiger salamander, mountain yellow-legged frog, and Yosemite toad. These additions reflect new proposals, listings, critical habitat designations, reintroduction efforts, and recent research findings. The Buena Vista lake shrew and critical habitat for the California Red legged frog was proposed for listing in 2000. The California tiger salamander was recently determined to be warranted for listing. Recent releases of captive-bred

condors in Ventura, Santa Barbara and San Luis Obispo Counties have increased the possibility that these birds may utilize the service areas. The mountain yellow-legged frog and the Yosemite toad are species found in the Sierra Nevada foothills, outside of the CVP's service areas. However, a recent study conducted by the U.S. Geological Survey and U.S. Department of Agriculture indicates that pesticide use in the San Joaquin Valley may be affecting populations of breeding amphibians in the Sierra Nevada mountain ranges due to prevailing summer winds.

Table 1.1 Species considered in this biological opinion, including common name, scientific name, Federal status and whether the species has critical habitat.

Note: Species in bold indicate new species not considered in Friant and Interim opinions and the amendment to the 1995 Interim opinion.

Common Name	Scientific Name	Federal Status	Critical Habitat
Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	Threatened	
Bakersfield cactus	<i>Opuntia basilaris treleasei</i>	Endangered	
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	
Blunt-nosed leopard lizard	<i>Gambelia silus</i>	Endangered	
Buena Vista lake shrew	<i>Sorex ornatus relictus</i>	Proposed	
California condor	<i>Gymnogyps californianus</i>	Endangered	Yes
California jewelflower	<i>Caulanthus californicus</i>	Endangered	
California red-legged frog	<i>Rana aurora draytonii</i>	Threatened	Proposed
California tiger salamander	<i>Ambystoma californiense</i>	Candidate	
Colusa grass	<i>Neostapfia colusana</i>	Threatened	
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	Endangered	
Delta smelt	<i>Hypomesus transpacificus</i>	Threatened	Yes
Fleshy owl's-clover	<i>Castilleja campestris ssp. succulenta</i>	Threatened	
Fresno kangaroo rat	<i>Dipodomys nitratoideis exilis</i>	Endangered	Yes
Giant garter snake	<i>Thamnophis gigas</i>	Threatened	
Giant kangaroo rat	<i>Dipodomys ingens</i>	Endangered	
Greene's tuctoria	<i>Tuctoria greeniei</i>	Endangered	
Hairy Orcutt grass	<i>Orcuttia pilosa</i>	Endangered	
Hartweg's golden sunburst	<i>Pseudobahia bahiifolia</i>	Endangered	
Hoover's spurge	<i>Chamaesyce hooveri</i>	Threatened	
Hoover's wooly star	<i>Eriastrum hooveri</i>	Threatened	

Table 1.1 Species considered in this biological opinion, including common name, scientific name, Federal status and whether the species has critical habitat.

Note: Species in bold indicate new species not considered in Friant and Interim opinions and the amendment to the 1995 Interim opinion.

Keck's checker-mallow	<i>Sidalcea keckii</i>	Endangered	
Kern mallow	<i>Eremalche kernensis</i>	Endangered	
Least Bell's vireo	<i>Vireo bellii pusillus</i>	Endangered	
Little Kern golden trout	<i>Oncorhynchus mykiss whitei</i>	Threatened	Yes
Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>	endangered	
Mountain plover	<i>Charadrius montanus</i>	Threatened	
Mountain yellow-legged frog	<i>Rana muscosa</i>	Candidate	
Palmate-bracted bird's-beak	<i>Cordylanthus palmatus</i>	Endangered	
Riparian brush rabbit	<i>Sylvilagus bachmani riparius</i>	Endangered	
Riparian woodrat	<i>Neotoma fuscipes riparia</i>	Endangered	
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	Threatened	
San Joaquin adobe sunburst	<i>Pseudobahia peirsonii</i>	Endangered	
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	Endangered	
San Joaquin Valley Orcutt grass	<i>Orcuttia inaequalis</i>	Threatened	
San Joaquin wooly-threads	<i>Lembertia congdonii</i>	Endangered	

Table 1.1 Species considered in this biological opinion, including common name, scientific name, Federal status and whether the species has critical habitat.

Note: Species in bold indicate new species not considered in Friant and Interim opinions and the amendment to the 1995 Interim opinion.

Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Yes
Tipton kangaroo rat	<i>Dipodomys nitratooides nitratooides</i>	Endangered	
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Threatened	Yes
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened	
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Endangered	
Yosemite toad	<i>Bufo canorus</i>	Candidate	

This biological opinion is consistent with the tiered implementation of the CVPIA, as described in the Programmatic Environmental Impact Statement for the CVPIA (PEIS) and the programmatic biological opinion on *Implementation of the CVPIA and Continued Operation and Maintenance of the CVP*, issued November 2000. The PEIS is a tiered NEPA document that allows for future site-specific NEPA analysis on CVPIA actions, including, as with this Proposed Action, the long-term renewal of CVP water service contracts (section 3404(c)).

Conclusion

The Service has concluded that the proposed action, as described in this opinion, is not likely to jeopardize the following species: Aleutian Canada goose, Bakersfield cactus, bald eagle, blunt-nosed leopard lizard, Buena Vista lake shrew, California condor, California jewelflower, California red-legged frog, California tiger salamander, Colusa grass, Conservancy fairy shrimp, Delta smelt, fleshy owl's-clover, Fresno kangaroo rat, giant garter snake, giant kangaroo rat, Greene's tuctoria, hairy Orcutt grass, Hartweg's golden sunburst, Hoover's spurge, Hoover's woolly star, Keck's checker-mallow, Kern mallow, least Bell's vireo, mountain plover, palmate-bracted bird's-beak, Sacramento splittail, San Joaquin adobe sunburst, San Joaquin kit fox, San Joaquin Valley Orcutt grass, San Joaquin wooly-threads, southwest willow flycatcher, Tipton kangaroo rat, valley elderberry longhorn beetle, vernal pool fairy shrimp, and vernal pool tadpole shrimp. The Service has concluded that the proposed action, described in this opinion, is not likely to adversely affect the bald eagle and California condor.

It was also concluded that, because of their close proximity, historic range and inclusion in future consultation actions, the riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*) should continue to be a focus of conservation efforts for this Proposed Action, if conservation efforts in this Project Description are determined to be expandable to encompass the needs of these species. The historic range of the riparian brush rabbit was within riparian forests along portions of the San Joaquin River and its tributaries on the Valley floor (Orr 1935 in Recovery Plan for Upland Species of the San Joaquin Valley, California). The riparian woodrat was historically believed to occur along the river bottom lands as far as southern Merced County or northern Fresno County (SJV Recovery Plan). Neither the

riparian brush rabbit nor riparian woodrat currently are found within the Friant Division or Cross Valley Unit service areas. The SJV Recovery Plan for Upland Species identifies efforts to restore and link riparian habitat, and reintroduce populations of riparian woodrats and brush rabbits as conservation actions needed to recover these species. Effects to these species is germane to the Friant Division and will be analyzed in future tiered consultations relevant to the Friant Division, including but not limited to Surplus Flood Flows Contracts and Implementation of the San Joaquin River Riparian Restoration Program..

This conclusion is based on the assumption that measures in this biological opinion are fully implemented. Actions that are not consistent with the Project Description in this document have not been analyzed for their impacts on the survival and recovery of proposed and listed species.

Study Area Description

Friant Division

The Friant Division includes 28 CVP contractors and one subcontractor as listed on Table 1.2 and identified in Figure 1.1. This Proposed Action includes only 27 of these contractors, excluding the city of Fresno. The service area and operating facilities associated with these divisions are summarized below. For a more detailed description, refer to the associated draft EA and BA for the Friant Division long-term contract renewal.

Table 1.2 Friant Division Contractors

Arvin-Edison Storage District	Lower Tule River Irrigation District
Chowchilla Water District	County of Madera (subdivisioncontractor)
Delano-Earlimart Irrigation District	Hidden Lakes Estates
Exeter Irrigation District	Madera Irrigation District
Fresno County Waterworks District No. 18	Orange Cove, City of
Fresno Irrigation District	Orange Cove Irrigation District
Garfield Water District	Porterville Irrigation District
Gravelly Ford Water District	Saucelito-Irrigation District
International Water District	Shafter-Wasco Irrigation District
Ivanhoe Irrigation District	Southern San Joaquin Municipal Utility District
Lewis Creek Water District	Stone Corral Irrigation District
Lindmore Irrigation District	Tea Pot Dome Water District
Lindsay, City of	Terra Bella Irrigation District
Lindsay-Strathmore Irrigation District	Tulare Irrigation District

Friant Division and operating facilities, including Friant Dam (Millerton Lake), the Friant-Kern Canal (FKC) and the Madera Canal (MC), are located on the eastern side of the San Joaquin Valley. Water for the Friant Division comes from the San Joaquin River, impounded at Millerton Lake which has a storage capacity of 520,000 acre-feet. From there water is released to the 152-mile long FKC which flows south and to the 36-mile long MC which flows north. The flow rate

of the FKC and the MC is 5,300 and 1,000 ft³/sec respectively. The terminus for the FKC is the Kern River and the MC is the Chowchilla River.

Although not part of the Friant Division, the Buchanan and Hidden Units provide CVP project water to Friant Division contractors through H. V. Eastman Lake and Hensley Lake. Eastman and Hensley Lakes are operated by the Army Corp of Engineers (COE). H. V. Eastman Lake is located on the Chowchilla River about 15 miles northeast of the City of Chowchilla. Operation facilities associated with the Buchanan Unit include Buchanan Dam, dikes and an extensive channel system. With a capacity of 150,600 acre-feet, a maximum of 45,000 acre-feet is allocated during flood season for flood storage. Buchanan Dam is operated to fill and empty Eastman Lake each year. From Buchanan Dam, water flows to the 30 mile-long Chowchilla Bypass Canal via Ash Slough, the main tributary of the Chowchilla River, thus providing CVP water to the Chowchilla Water District.

Hensley Lake is located on the Fresno River about 15 miles northeast of the City of Madera. Operation facilities associated with the Hidden Unit are Hidden Dam, dikes and extensive channel system. With a capacity of 82,500 acre-feet, a maximum of 65,000 acre-feet is allocated during flood seasons for flood control storage. The Fresno River flows from Hensley Lake to the 13.3 mile-long Madera Canal and provides CVP water to the Madera Irrigation District.

The Buchanan Unit provides Chowchilla Water District with 24,000 acre-feet of CVP project water and the Hidden Unit provides Madera Irrigation District with 24,000 acre-feet of CVP project water.

Cross Valley Division

The Cross Valley Division includes 8 contractors and 11 subcontractors as listed on Table 1.3 and identified on Figure 1.1. The service area and operating facilities associated with these divisions are summarized below. For a more detailed description, refer to the draft EA (October 2000) and the BA for the Cross Valley Long Term Contract Renewal.

In 1975, a locally financed Cross Valley Canal (CVC) began operations that routed water from the California Aqueduct (Aqueduct) to the east side of the valley through a series of six lift pumps. The CVC connects to the Aqueduct near Taft, California and conveys water across the valley to the vicinity of the Friant-Kern Canal. The CVC actually does not connect with the Friant-Kern Canal. Instead, water is delivered to the Arvin-Edison Storage District in exchange for a portion of Central Valley Project (CVP) water available through Millerton Lake. Through a series of complex water purchase, transport and exchange agreements, water is exchanged between the Arvin-Edison Storage District and six of the Cross Valley Contractors with contracts for CVP water pumped from the Delta. These exchange contractors are located north of the CVC, along the Friant-Kern Canal.

Table 1.3 Cross Valley Division Contractors

Pixley Irrigation District	County of Tulare (subcontractors)
Hill's Valley Irrigation District	Alpaugh Irrigation District
Kern-Tulare Water District	Atwell Island Water District
Lower Tule River Irrigation District	Hills Valley Irrigation District
Rag Gulch Water District	City of Lindsey WSA
County of Fresno (subcontractor)	Saucelito Irrigation District
Fresno County Water Works #34	Smallwood Vineyards
Tri-Valley Water District	Stone Corral Irrigation District
	Strathmore Public Utilities District
	Styro Tech
	City of Visalia

The Arvin-Edison Storage District annually exchanges water with six Cross Valley contractors on a 1:1 water exchange ratio. Two of the Cross Valley Contractors do not participate in a water exchange with the Arvin-Edison Storage District. Pixley Irrigation District and Lower Tule River Irrigation District have discontinued the exchange with the District and have transferred their water to other CVP water contractors. In turn they use proceeds from the transfers to purchase replacement water from willing sellers. These transfers are not considered in this opinion and may require separate section 7 determinations.

Definitions of Terms

Numerous terms and acronyms are used for actions and projects within the CVP and CVPIA. In this document use of acronyms has been limited to those entities, acts, and descriptors that are referred to frequently. A list of these acronyms is provided below.

CVP..... Central Valley Project
CVPIA..... Central Valley Project Improvement Act
DFG..... California Department of Fish and Game
DWR..... California Department of Water Resources
ESA..... Endangered Species Act
HCP..... Habitat Conservation Plan
M&I..... Municipal and Industrial
NEPA..... National Environmental Policy Act
NMFS..... National Marine Fisheries Service
O&M..... Operation and Maintenance
PEIS..... Programmatic Environmental Impact Statement for the CVPIA
SWRCB..... State Water Resources Control Board

The following definitions of terms will provide clarity for the reader.

Authorized Place of Use - An area established by Reclamation's water rights permits which are issued by the California State Water Resources Control Board within which the CVP water can be used.

District Boundary - legally recognized area where the District does business. The boundary is filed with and maintained by the California Secretary of State.

District Service Area - (as defined by the Bureau of Reclamation) - area to which a water district can deliver CVP water. It is an area equal to or less than the district's legal boundary. The reduction would account for those areas that are inside the district's boundaries but outside the authorized place of use and not entitled to CVP water utilization.

Consultation History - Related Consultations

The consultation history of water contract renewals for the Friant Division and the Cross Valley Unit of the CVP is quite extensive, including the 1991 Friant long-term water contract renewal consultation, three interim water contract consultations covering both the Friant Division and Cross Valley Unit (1995, 1998, 2000), and consultations on other large-scale projects and plans that impact species protected under the ESA. The biological opinions resulting from these consultations stand on their own merits, have established thresholds to ensure survival and recovery of listed species, and have established, or work towards establishing, a baseline for the effects considered by the consultations. Of particular note are: the Service's October 15, 1991, biological opinion on the Friant Water Contract Renewals (Friant, Service file #1-1-91-F-22); the Service's opinions on the Los Vaqueros Project--in particular the September 9, 1993, opinion (Los Vaqueros, Service file #1-1-93-F-35) and the April 27, 2000, opinion on the Los Vaqueros Pipeline (Los Vaqueros Pipeline, Service file #1-1-99-F-93); the Service's December 27, 1994, biological opinion on Interim Water Contract Renewal (Interim, Service file #1-1-94-F-69); the Service's March 6, 1995, biological opinion on Reclamations's Long-term Operations Criteria and Plan (OCAP, Service file #1-1-94-F-70); and the programmatic consultation on Implementation of the CVPIA and Continued Operation and Maintenance of the CVP (CVPIA, #1-1-98-F-0124).

To assist in support and understanding of this opinion, we have provided the following time line of recent Service biological opinions, germane to this opinion. Records of these consultations are on file at the Service's Sacramento Fish and Wildlife Office (SFWO). (Note: Service file number in parenthesis and addressed species identified in each).

October 15, 1991—Friant Water Contract Renewals (1-1-91-F-22), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species (amended May 14, 1992, appended to 1-1-95-F-39 on February 27, 1998)

February 12, 1993—Long-Term Operations Criteria and Plan for CVP Reservoirs (1-1-93-F-10), bald eagle, salt marsh harvest mouse, California clapper rail.

May 23, 1993—Operations Criteria and Plan (1-1-92-F-18), bald eagle, salt marsh harvest mouse, California clapper rail.

May 26, 1993—1993 Operations Criteria and Plan-Delta smelt (1-1-93-F-32) delta smelt.
September 2, 1993—Los Vaqueros vernal pool shrimp conference opinion (1-1-93-C-68), vernal pool fairy shrimp, longhorn fairy shrimp, California linderiella.
September 9, 1993—Los Vaqueros Project (1-1-93-F-35), delta smelt.
February 4, 1994—1994 Operations Criteria and Plan (1-1-94-F-2), delta smelt.
December 27, 1994—Interim Water Contract Renewal (1-1-94-F-69), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.
February 23, 1995—Amendment of December 27, 1994, Interim Water Contract Renewal opinion to include critical needs planning (1-1-95-F-39).
March 6, 1995—Long-term Operations Criteria and Plan (1-1-94-F-70) delta smelt, delta smelt critical habitat, Sacramento splittail [amended April 26, 1995 (1-1-95-I-804)].
August 14, 1996—Interim Operation of Kern Water Bank (1-1-95-F-63), San Joaquin kit fox and many others. [Action converted to a Habitat Conservation Plan (1-1-97-F-108)].
April 26, 1996—Temporary Barriers (1-1-96-F-53), delta smelt and delta smelt critical habitat.
January 20, 1998—Interim Water Contract Renewal Opinion amendment (1-1-98-I-383), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.
February 27, 1998—Reinitiation of Formal Endangered Species Consultation on the Supplemental Interim Renewal of Central Valley Project Water Contracts to include 14 Friant Water Contracts (1-1-98-I-595), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species.
March 19, 1998—Refuge Water Supply Program (1-1-98-F-61) giant garter snake.
May 4, 1998—Draft Jeopardy on Interim South Delta Project (1-1-97-F-184), delta smelt and delta smelt critical habitat.
December 7, 1998—Conveyance of Refuge Water Supply East and West Sacramento Valley (1-1-99-F-15) giant garter snake.
March 11, 1999—Water Service Contracts with Sacramento County Water Agency, San Juan Water District, and City of Folsom (1-1-97-F-161), several species.
March 19, 1999—Solano Project Contract Renewal (1-1-99-F-54), several species.
April 27, 1999—Los Vaqueros Pipeline, Contra Costa County (1-1-99-F-039), several species.
June 28, 1999—Refuge Water Conveyance Mendota Wildlife Management Area, Kern and Pixley National Wildlife Refuges (1-1-99-F-36) several species.
September 21, 1999—CVPIA Land Retirement Program Demonstration Project, Fresno, Kings and Tulare Counties (1-1-99-F-125) several species.
February 29, 2000—Interim Biological Opinion (1-1-00-F-0056) several species.
March 24, 2000—California Toxics Rule (1-1-98-F-21) several species.
November 21, 2000—Implementation of the CVPIA and Continued Operation and Maintenance of the CVP, Programmatic Consultation (#1-1-98-F-0124).

1991 Friant Biological Opinion

The Friant opinion of 1991 (Friant opinion) (Service File No. 1-1-91-F-22) covered 28 CVP contracts in the Friant Division that were to be renewed prior to 2028. Since 1991, 26 of the 28 contracts of the Friant Division have been renewed for a number of Interim periods. The Service determined that Reclamation's proposed action likely would not jeopardize the continued existence of 14 affected listed species inhabiting the Friant service area and San Joaquin Valley or adversely modify or destroy any designated critical habitat. In addition, the Service concluded that although the least Bell's vireo's continued existence likely would not be jeopardized, proposed contract renewal could adversely affect this species recovery. The Service also

determined in its preliminary review of the action that affected species outside the San Joaquin Valley likely would not be jeopardized by Friant contract renewal. The Service based its conclusion on implementation of mitigation measures, including an endangered species conservation program, to compensate for continued water delivery to the Friant Division contractors and protect listed species.

1995 Interim Biological Opinion

The Interim biological opinion dated February 27, 1995 (Service File No. 1-1-95-F-39) provided coverage for 67 water service contracts (including 12 of the 28 Friant Division contracts covered in the Friant opinion and 9 Cross Valley contractors) for a period of 3 years. The Service concluded that the Interim renewal of water contracts was not likely to jeopardize the continued existence of 21 listed species if mitigation measures as described by Reclamation were implemented. In addition, a number of Reasonable and Prudent Measures (RPM) were provided to reduce incidental take of listed species. Mitigation measures in the Project Description of this opinion formed the basis of commitments for subsequent Interim renewals (1998 and 2000), and for those commitments which are still ongoing and not fully implemented, are included as commitments in this opinion for long-term contract renewal.

1998 Interim Biological Opinion

In February 1998, Reclamation completed a supplemental EA to provide for renewal of 54 Interim contracts for a period of 2 years (February 1998 to February 2000) and the Service concurred with Reclamation that issuance of Interim CVP contracts for an additional 2 years was not likely to adversely affect newly listed species (Service File No. 1-1-98-I-383). In addition, the February 1998 Reclamation requested the Interim biological opinion be amended to include an additional 14 contractors of the Friant Division. The Service then determined that given the conditions specified in the Project Description (e.g., the deliveries of water will continue under the same terms as before), the Service concurred with Reclamation that issuance of Interim water contracts from February 1998 to February 2000 in the Friant service area would not likely to adversely affect newly listed species (Service File No. 1-1-98-I-595).

Between 1995 and 1998, the 67 contracts covered by the Interim opinion were reduced to 54 through consolidation, termination, or assignment, including a reduction of 1 contractor for the Cross Valley Division. During that time, the nine Cross Valley contractors were reduced to eight as a result of the Ducor ID becoming a subcontractor of the County of Tulare.

2000 Interim Contract Renewal

On February 29, 2000 the Service issued a biological opinion which addressed the effects of the proposed renewal by the U.S. Bureau of Reclamation (Reclamation) of 54 Interim contracts and the continued delivery of this contracted water to 54 Interim contracts (including 12 Friant and 8 Cross Valley Division contracts) and 14 existing Friant Division water service contracts, in accordance with Section 3404(c) of the Central Valley Project Improvement Act (CVPIA), for a maximum period of 1 year, from March 1, 2000 through February 28, 2001 (Service File No. 1-

1-00-F-0056) . This opinion covered water contracts within the Interim and Friant Division contract service areas for agricultural, municipal, and industrial purposes, that would not exceed water allocations identified by CVP operations criteria in February 2000, including any updates, and would not exceed historical maximum contract quantities analyzed in the Interim biological opinion of 1995 (Interim opinion), or the Friant biological opinion of 1991 (Friant opinion). To reach a no jeopardy conclusion for this opinion, the following actions discussed in the draft EA for this action were not covered by this opinion and may require separate section 7 or section 10 authorization:

- Mercy Springs partial assignment to Pajaro Valley Water Management District, Santa Clara Valley Water District, and Westlands Water District;
- Any future assignments involving Interim or Friant contractors;
- Transfers and/or exchanges involving Interim or Friant contractors;
- Inclusions and exclusions to Interim and Friant contract service area boundaries;
- Future changes in purpose of use from Ag only to Ag/M&I involving Interim or Friant contractors;
- Proposed increases above existing maximum contract quantities to Tehama-Colusa and Corning Canal contractors;
- Any increases in deliveries above actual allocations identified by CVP operations criteria in February 2000, including any updates, and above historical maximum contract quantities analyzed in the Interim biological opinion of 1995 (Interim opinion), or the Friant biological opinion of 1991 (Friant opinion).

2000 Biological Opinion on the Implementation of the CVPIA and Continued Operation and Maintenance of the CVP

This biological opinion addressed both operations and maintenance of the CVP and implementation of the CVPIA of 1992. The description of the Proposed Action was developed collaboratively by Reclamation and the Service and included, in part, a description of the proposed actions found in the Final PEIS for the CVPIA.

Commitments to uphold the ESA by both agencies, combined with implementation of these programs and meeting the assumptions of the effects analysis have contributed to a conclusion of no jeopardy in this biological opinion. This no-jeopardy conclusion at the programmatic scale is not intended to, and does not, preclude the Service from making a future jeopardy determination based on the effects analysis for a site specific action. However, the (1) collection of data and monitoring, (2) communication, cooperation, and outreach, (3) conservation, restoration, compensation, and commitments to work together to recover listed species, and (4) site specific consultation all diminish the likelihood of future jeopardy opinions tiered under this programmatic biological opinion.

Description of the Proposed Action

Consistent with Reclamation law including, but not limited to, section 3404(c) of the CVPIA, Reclamation proposes to renew long term water contracts with Friant Division and Cross Valley Unit of the CVP as is necessary for continued delivery of CVP water supplies for agricultural, municipal, and industrial uses for a 25 year period from 2001 through 2026. Renewal of CVP contracts will also assist meeting the following purposes:

- Continued beneficial use of water, developed and managed as part of the CVP, with a reasonable balance among competing demands, including: irrigation and domestic uses; fish and wildlife protection, restoration, and mitigation; fish and wildlife enhancement; power generation; and other water uses consistent with requirements imposed by the State Water Resources Control Board and the CVPIA.
- Incorporate certain administrative conditions in to the renewed contract to ensure CVP continued compliance with the current Federal reclamation law and other applicable statutes.
- Allow the continued reimbursement to the Federal government for costs related to CVP construction and operation.

Background

Friant Division and Cross Valley Unit CVP contractors have been involved in Section 7 consultations for the delivery of CVP water supplies for many years. The Friant biological opinion of 1991 (Friant opinion) covered 28 CVP contracts in the Friant Division that were to be renewed over a 36 year period. Since 1991, 26 of the 28 contracts of the Friant Division and all of the Cross Valley Division contracts have been renewed for a number of Interim periods. The Interim biological opinion, dated February 27, 1995, provided coverage for 67 water service contracts (including 12 Friant Division contracts covered in the Friant opinion) for a period of 3 years. Between 1995 and 1998, the 67 contracts covered by the Interim opinion were reduced to 54 through consolidation, termination, or assignment. In February 1998, Reclamation completed a supplemental Environmental Assessment (EA) to provide for renewal of 54 Interim contracts for a period of 2 years (February 1998 to February 2000) and the Service concurred with Reclamation that issuance of Interim CVP contracts for an additional 2 years was not likely to adversely affect newly listed species. In addition, in February of 1998 Reclamation requested the Interim biological opinion be amended to include an additional 14 contractors of the Friant Division. The Service then determined that given the conditions specified in the Project Description (e.g., the deliveries of water will continue under the same terms as before), the Service concurred with Reclamation that issuance of Interim water contracts from February 1998 to February 2000 in the Friant service area would not likely adversely affect newly listed species.

Then in November of 2000, the Service completed the programmatic consultation for *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*. This resulted in the acceptance and adoption of numerous conservation measures (commitments) that will be applied to tier actions for implementing CVPIA, like the long-term renewal of CVP water supply contracts.

Coordinated Operations Agreement Between CVP and SWP

The Coordinated Operations Agreement is essential to establishing the baseline condition for this opinion. If changes in the Coordinated Operations Agreement are made that *may affect* listed species, Reclamation will initiate informal consultation with the Service and NMFS.

In 1986, the Coordinated Operating Agreement defined the rights and responsibilities of the CVP and SWP in meeting Sacramento Valley and Delta water needs, based on the water quality objectives specified in Decision (D)-1485. When water must be withdrawn from reservoir storage to meet Sacramento Valley in-basin requirements, 75 percent of the water is provided by the CVP and 25 percent is provided by SWP. When water from non-CVP/SWP sources and unregulated flow into the Delta is available for export in the Delta, the sum of CVP storage gains, SWP storage gains, and the available flow for export in the Delta is apportioned to give 55 percent to the CVP and 45 percent to SWP. If one party cannot use its share of available water, the other party may use the available water. When there is more than sufficient water to meet all Delta beneficial use standards, the Coordinated Operating Agreement allows the CVP and SWP to store and export as much of the additional water as possible within physical and contractual limits.

The State and Federal pumps at Tracy, together with the riparian water rights holders downstream (especially the Delta farmers) are capable of pumping at rates greater than the inflow to the Delta. This is compensated for by increasing the flows through the Central Valley by releasing more water from Reclamation reservoirs, particularly Shasta and Folsom.

A mechanism for measuring the balance of inflow and outflow in the Delta is determination of the location of increased salinity in the Delta, specifically 2.0 parts per thousand, which is referred to as X2. However, there is a lag time between the detection, or modeling, of upstream movement of X2 and the ability to shift X2 downstream. The location of X2 at or downstream of Chipps Island is the keystone of the Service's March 6, 1995, OCAP biological opinion (see that opinion for further discussion and details). It takes about three days for increased releases from Shasta to increase the outflows past Chipps Island. It takes a little more than a full day for increases from Folsom to reach Chipps Island. Currently, the pumps at Tracy are not slowed during the time between the detection of negative flows and the time when compensating releases balance the Delta pumping rate.

The four Federal pumps are each on or off. The State Water Project has 16 pumps, and each pump has an adjustable pumping rate. Combined operation of the two types of pumps, on/off or adjustable rate, affects how the "ramping down," or decreases in pumping rate can be accomplished during any periods when Delta inflows lag behind the pumping rate in the Delta, relative to the rate of release from Reclamation reservoirs. The current Coordinated Operations

Agreement may not adequately provide for the configurations of how many pumps are on and the rate of pumping of the State pumps that are in use.

Contract Supply

The quantity of water to be made available to the contractors in this Project Description has remained the same as previous contracts with the Friant and Cross Valley Division contracts. The amount of water available for delivery in any given year to CVP water service contractors is dependent upon hydrologic, environmental, and reservoir storage conditions. Full entitlements are 2,115,975 acre-feet for the Friant Division and 128,300 acre-feet for the Cross Valley Division.

The Friant Division employs a two-class system of water service contracts to support conjunctive use of surface water and groundwater. Class 1 contracts relate to "dependable supply," and are usually assigned to users with limited access to good quality groundwater. Class 2 contracts are usually held by water users with access to good quality groundwater for use during surface water deficiency, and often involve groundwater recharge and recharge/exchange agreements. The Class 1 allotment for Friant Division is about 800,000 acre-feet and Class 2 allotment total about 1,401,475 acre-feet. The Class 1 and 2 entitlements for each contractor in the Friant Division are listed in Table 1.4. The contractors, district size, and maximum water entitlements for the twenty-seven Friant Division water contractors and the eight Cross Valley Division water contractors are described in Table 1.4 for Friant Division and Table 1.5 for Cross Valley.

Water will continue to be delivered to the Friant Division and Cross Valley Unit in quantities that approximate amounts provided on Table 2 and 3 below. Reclamation and the Service will coordinate, for ecosystem-level planning purposes relative to water deliveries to CVP contractors. Reclamation will provide information to the Service on annual deliveries each year, prior to or concurrent with informing the water districts provide on their allocation amounts. However, it is understood biological opinions for OCAP (1-1-94-F-70) and Los Vaqueros (1-1-95-F-117 and 1-1-95-F-134) are in place, and at no time can the total amount of these CVP deliveries exceed the total consolidated amount considered in these opinions. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these CVP deliveries *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of annual delivery information provided by Reclamation, the Service believes effects related to these CVP deliveries *may affect* federally listed species and/or their *critical habitat*, the Service will request Reclamation to consult under Section 7 of the ESA.

The provisions of the contracts are summarized and compared to those of the existing Interim contract renewal process in Tables 1.6 and 1.7. A sample of the long term renewal contracts for both Friant Division and Cross Valley Unit is attached as Appendix A. Water would continue to be delivered to CVP contractors through existing facilities. It would not involve the construction of any new facilities, the installation of any new structures, or the modification of existing facilities. The renewal of long-term contracts would continue to provide the existing supply for agriculture, municipal and industrial use. This biological opinion is based on analyzing the

specific proposed actions contained in these contracts. These contracts will be executed on March 1, 2001 and will expire on February 28, 2026.

Purpose of Use

Water supplied by Reclamation to the contractors and subcontractors is intended for two categories of use. "Irrigation Water" (Ag only) is water made available to be used primarily in the production of agricultural crops or livestock, including domestic use incidental thereto, and watering of livestock. "Municipal and Industrial Water" (M & I) is water made available for human use and purposes such as the watering of landscaping or pasture for animals which are kept for personal enjoyment (e.g. horses) or water delivered to land holding operated in units of less than five acres unless the Contractor establishes to the satisfaction of Reclamation and the State that the use is for agricultural purposes. The purpose of use for Friant Division and Cross Valley Unit contractors are listed in Tables 1.4 and 1.5.

Shortage Provisions

Reclamation proposes to deliver full contract entitlements, when available. If there is a reduction in the total water supply available to contractors because of errors in project physical operations, drought, or other physical causes beyond the control of the United States, no liability will accrue to the United States or any of its officers, agents, or employees for any damages, except for such actions taken by the Contracting Officer which are arbitrary, capricious, or not made in good faith. In case of severe water shortage, agricultural deliveries may be reduced by up to 100 percent, if necessary.

Historically, approximately 90 percent of the CVP water has been delivered to agricultural users. In recent years, M&I usage of CVP water is increasing due to expansion of urban areas, changes in water contracts allowing conversion from agricultural to M&I uses, and the facilitation of increased water transfers by the CVPIA. In the future, the Service anticipates that a greater percentage of CVP contract allotment will be allocated to M&I uses. This conversion from agricultural purpose of use to M&I purpose of use of CVP water could place increasing demand on available water south of the Delta and could serve to limit the amount of water available for fish and wildlife purposes south of the Delta; thus impacting threatened and endangered species in the San Joaquin Valley.

There are no separate shortage provisions applicable to agricultural and M&I contracts in either the Friant or Cross Valley Canal contracts. In the case of Friant Division contractors, shortage allocations are determined by the class of water under contract (discussed below). For example, Class 2 contract water deliveries are reduced to zero before any reductions are imposed upon Class 1 contract supplies. This is true regardless of whether such contract water is delivered for use as agricultural or M&I water. With respect to Cross Valley Canal contract deliveries, all allocations are made based upon agriculture notwithstanding that some contract and subcontract deliveries are for M&I uses.

If the interpretation and implementation of the shortage provisions described in this Project Description change, Reclamation will coordinate with the Service to ensure that such changes in shortage provisions do not adversely affect listed species

Table 1.4 Friant Division water contractors, district size, maximum water entitlements and deliveries.

FRIANT DIVISION WATER CONTRACTORS								
Name	Purpose of Use of Water (AG or M&I)	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement Class 1 (acre ft/yr)	Annual Entitlement Class 2 (acre ft/yr)	Total of All Entitlements	Average Annual Deliveries ^{1,2} (acre-feet)	Maximum Annual Delivery ^{1,2} (acre-feet)
Arvin-Edison Storage District	Both	132,849	118,879	40,000	311,675	351,675	45,560	183,117
Chowchilla Water District	AG	85,619	78,435	55,000	160,000	215,000	72,969	168,709
Delano-Earlimart Irrigation District	Both	56,612	50,856	108,800	74,500	183,300	95,565	152,592
Exeter Irrigation District	Both	15,184	13,385	11,500	19,000	30,500	9,682	15,393
Fresno County Waterworks District No. 18	M&I	253	NA	150	0	150	109	150
Fresno Irrigation District	Both	247,871	157,207	0	75,000	75,000	13,544	75,453
Garfield Water District	AG	1,812	1,705	3,500	0	3,500	3,102	4,382
Gravelly Ford Water District	AG	8,431	7,306	0	14,000	14,000	4,369	14,000
International Water District	Both	724	682	1,200	0	1,200	1,106	2,200
Ivanhoe Irrigation District	Both	10,982	10,401	7,700	7,900	15,600	9,262	10,874
Lewis Creek Water District	AG	1,297	1,185	1,450	0	1,450	1,580	2,472
Lindmore Irrigation District	Both	27,669	26,000	33,000	22,000	55,000	23,855	44,683
City of Lindsay	M&I	1,525	NA	2,500	0	2,500	1,307	2,108
Lindsay-Srathmore Irrigation	Both	16,094	14,075	27,500	0	27,500	18,091	25,811
Lower Tule River Irrigation District	AG	103,270	90,448	61,200	238,000	299,200	109,839	273,896
County of Madera ¹	M&I	154	NA	200	0	200	48	178
Madera Irrigation District	AG	130,703	118,113	85,000	186,000	271,000	124,296	213,500
Orange Cove, City of	M&I	960	NA	1,400	0	1,400	1,091	1,483
Orange Cove Irrigation District	Both	29,277	26,533	39,200	0	39,200	26,577	36,283
Porterville Irrigation District	AG	17,035	15,410	16,000	30,000	46,000	2,157	15,364
Saucelito Irrigation District	AG	19,825	18,943	21,200	32,800	54,000	26,314	46,339
Shafter-Wasco Irrigation District	Both	38,992	34,957	50,000	39,600	89,600	48,334	86,935
Southern San Joaquin Municipal Utility District	Both	61,617	51,004	97,000	50,000	147,000	88,072	121,226
Stone Corral Irrigation District	AG	6,882	6,429	10,000	0	10,000	8,296	10,001

Table 1.4 Friant Division water contractors, district size, maximum water entitlements and deliveries.

FRIANT DIVISION WATER CONTRACTORS								
Name	Purpose of Use of Water (AG or M&I)	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement Class 1 (acre ft/yr)	Annual Entitlement Class 2 (acre ft/yr)	Total of All Entitlements	Average Annual Deliveries ^{1,2} (acre-feet)	Maximum Annual Delivery ^{1,2} (acre-feet)
Tea Pot Dome Water District	AG	3,570	3,360	7,500	0	7,500	6,172	7,500
Terra Bella Irrigation District	Both	13,913	12,819	29,000	0	29,000	14,155	26,214
Tulare Irrigation District	Both	73,508	64,271	30,000	141,000	171,000	43,959	127,689
TOTAL		1,106,628	922,403	740,000	1,401,475	2,141,475	799,411	1,668,552

¹ Annual Deliveries are the sum of Class 1 and Class 2 waters.

² Reported amounts may exceed contract entitlement due to a transfer of CVP water from one contractor to another.

³ Includes subdivision: Hidden Lake Estates

Table 1.5 Cross Valley Division water contractors, district size, maximum water entitlements and deliveries.

Cross Valley Water Contractors						
Name	Purpose of Use of Water	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement	Average Annual Deliveries ¹ (acre-feet)	Maximum Annual Deliveries ¹ (acre-feet)
Pixley Irrigation District	Both	69,974	56,047	31,102	14,919	36,296
Hill's Valley Irrigation District	Both	4,558	3,174	3,346	1,376	3,477
Kern-Tulare Water District	Both	21,698	20,366	40,000	14,518	38,625
Lower Tule River Irrigation District	Both	103,270	90,448	31,102	13,250	30,266
County of Tulare ²	Both	19,092	12,788	5,308	1,996	5,865
Rag Gulch Water District	Both	5,998	5,674	13,300	5,632	20,048
County of Fresno ³	Both	21,008	0	3,000	1,078	2,919
Tri-Valley Water District	Both	2,900	1,730	1,142	805	4,487
TOTAL		248,498	190,227	128,300	53,574	141,983

¹ Reported amounts may exceed contract entitlement due to a transfer of CVP water from one contractor to another.

² Includes subcontractors: Alpaugh ID, Atwell Island WD, Hills Valley ID, City of Lindsay WSA, Saucelito ID, Smallwood Vineyards, Stone Corral ID, Strathmore Public Utilities District, Stryo Tech Inc, and City of Visalia

³ Includes subcontractor: Fresno County WW #34

Provisions of Negotiated Contract

The following tables (Table 1.6 and 1.7) summarize the contract provisions of the long-term renewal contracts for Cross Valley Unit and Friant Divisions. A representative contract from each Division is attached in Appendix A. This biological opinion is based upon analyzing the specific proposed actions contained in these contracts. These contracts will be executed on March 1, 2001 and expire on February 28, 2026.

Table 1.6 Summary of contract provisions from interim contract (existing) and negotiated long term contract (proposed project) for Friant Division Contractors

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Friant Division Contractors
Explanatory Recitals	No similar recital.	Assumes water rights held by CVP from SWRCB for use by water service contractors under CVP policies
	No similar recital.	Assumes CVP has been relied upon and considered essential by contractors
	No similar recital.	Assumes Secretary through coordination, cooperation and partnership will pursue measures to improve water supply
	No similar recital.	Assumes that loss of water supply reliability would have impact on socioeconomic conditions and change land use
Definitions		
"Charges"	Assumes to be payments in addition the Rates determined by the Contracting Officer each year.	Assumes rewording of definition of Charges to exclude both Rates and Tiered Pricing Increments
"Contract Total"	No similar definition.	Total of Class 1 and Class 2 Supply of Project Water
"Landholder"	Assumes to be entity owning lands served irrigation water.	Landholder described in existing Reclamation Law
"M&I Water"	Assumes to be for other than irrigation or to provide water for irrigation of land in units less than or equal to 5 acres as M&I water unless Contracting Officer satisfied use is irrigation.	Same as IRC
Terms of Contract - Right to Use Contract	Assumes subsequent interim renewal only for stated circumstances precluding a long-term renewal.	Assumes contracts shall be renewed subject to conditions for Ag and unconditioned for M&I Sets Dec. 31, 2024 as date on which determination on conversion may be made upon mutually agreeable terms
Water to be Made Available and Delivered to the Contractor	Assumes water availability in any year dependent upon existing conditions	Same as IRC.
	Assumes compliance with biological opinions and other environmental documents for contracting.	Assumes rewording to add requirement contractor is within legal authority to implement.

Provision	Existing – Based on Interim Renewal Contract	Proposed – Based on Final Negotiated Contract for Friant Division Contractors
	No similar provision.	Assumes that current operating policies strive to minimize impacts to CVP water users
Time for Delivery of Water	Assumes methods for determining timing of deliveries	Assumes methods for determining timing of deliveries as in existing contracts
Point of Diversion and Responsibility for Distribution of Water	Assumes methods for determining point of diversion	Assumes methods for determining point of diversion as in existing contracts
Measurement of Water Within District	Assumes measurement for each turnout or connection for facilities that are used for all water supplies	Same as IRC
Rates and Method of Payment for Water	Does not include Tiered Pricing. Assumes advanced payment for rates for 2 months.	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for 2 months.
Non-interest Bearing Operation and Maintenance Deficits	Assumes either there is no non-interest bearing deficit or that agreement is in place to retire any non-interest bearing deficit.	Assumes language from existing contracts
Sales, Transfers, or Exchanges of Water	Assumes sales, transfers or exchanges with others. Does not discuss rates applicable to such actions.	Assumes continuation of transfers with rate for transferred water being transferor's rate adjusted for additional or reduced costs related to transfer and adjusted to remove any ability to pay relief.
Application of Payments and Adjustments	Assumes refund of overpayment after satisfaction of any accrued indebtedness upon contractor request.	Assumes minor changes associated with methods described for overpayment including requirement for \$1,000 or greater overpayment for refund.
Temporary Reduction - Return Flows	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Friant Division Contractors
Constraints on Availability of Project Water	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.
Unavoidable Groundwater Percolation	Assumes that some of applied CVP water will percolate to groundwater	Same as IRC
Rules and Regulations	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Water and Air Pollution Control	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Quality of Water	Assumes that CVP will operate in accordance with existing rules without obligation to operate towards water quality goals	Same as IRC.
Water Acquired by the Contractor Other than from the United States	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Opinions and Determinations	Opinions and determinations not to be arbitrary, capricious or unreasonable. Parties may seek relief, adjustment, monetary damages if they are.	Assumes minor changes with respect to references to the right to seek relief
Coordination and Cooperation	No similar provision.	Assumes that coordination and cooperation between CVP operations and users should be implemented and CVP users should participate in CVP operational decisions. Parties retain exclusive decision making authority.
Charges for Delinquent Payments	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Equal Opportunity	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
General Obligation	Assumes that CVP will operate in accordance with existing rules	Assumes that CVP will operate in accordance with existing rules, however assumes no requirement for contractor to levy in advance

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Friant Division Contractors
Compliance with Civil Rights Laws and Regulations	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Privacy Act Compliance	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Contractor to Pay Certain Miscellaneous Costs	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Water Conservation	Assumes compliance with conservation programs established by Reclamation and the State	Same as IRC.
Existing or Acquired Water or Water Rights	Assumes that CVP will operated in accordance with existing rules	Same as IRC.
Operation and Maintenance by Non-federal Entity	Assumes non-federal entity will operate and maintain facilities and that certain payments to be made to that entity.	Assumes minor changes to language that would allow subsequent modification of operational responsibilities
Contingent on Appropriation or Allotment of Funds	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Books, Records, and Reports	Assumes that CVP will operate in accordance with existing rules	Assumes changes for record keeping for both CVP operations and CVP users
Assignment Limited	Assumes that CVP will operate in accordance with existing rules	Assumes changes to facilitate assignments
Severability	Assumes that CVP will operate in accordance with existing rules	Same as IRC
Resolution of Disputes	No similar provision.	Assumes a Dispute Resolution Process

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Friant Division Contractors
Officials Not to Benefit	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Changes in Contractor's Service Area	Assumes that CVP will operate in accordance with existing rules	Assumes changes to limit rationale used for non-consent with no set time limit for assumed consent
Notices	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Confirmation of Contract	Assumes that CVP will operate in accordance with existing rules	Assumes Court confirmation of contract and includes provision that contract not binding until court confirms is deleted.

Table 1.7 Summary of contract provisions from interim contract (existing) and negotiated long term contract (proposed project) for Cross Valley Division.

Provision	Existing – Based on Interim Renewal Contract	Proposed – Based on Final Negotiated Contract for Cross Valley Contractors
Explanatory Recitals	No similar recital.	Assumes water rights held by CVP from SWRCB for use by water service contractors under CVP policies
	No similar recital.	Assumes CVP has been relied upon and considered essential by contractors
	No similar recital.	Assumes Secretary through coordination, cooperation and partnership will pursue measures to improve water supply
	No similar recital.	Assumes that loss of water supply reliability would have impact on socioeconomic conditions and change land use
Definitions		
"Base supply"	No similar definition.	Quantity of Project Water designated in contracts as the amount determined from historic deliveries and is considered relatively reliable in normal or wet years
"Charges"	Assumes to be payments in addition the Rates determined by the Contracting Officer each year.	Assumes rewording of definition of Charges to exclude both Rates and Tiered Pricing Increments
"Contract Total"	No similar definition.	Total of Base Supply and Supplemental Supply of Project Water and is subject to south of delta criteria.
"Landholder"	Assumes to be entity owning lands served irrigation water.	Landholder described in existing Reclamation Law
"M&I Water"	Assumes to be for other than irrigation or to provide water for irrigation of land in units less than or equal to 5 acres as M&I water unless Contracting Officer satisfied use is irrigation.	Same as IRC
"Supplemental Supply"	No similar definition.	Quantity of Project water that is in addition to and less reliable than the Base Supply.
Terms of Contract - Right to Use Contract	Assumes subsequent interim renewal only for stated circumstances precluding a long-term renewal.	Assumes contracts shall be renewed subject to conditions for Ag and unconditioned for M&I
		Sets Dec. 31, 2024 as date on which determination on conversion may be made upon mutually agreeable terms

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Cross Valley Contractors
Water to be Made Available and Delivered to the Contractor	Assumes water availability in any year dependent upon existing conditions	Same as IRC.
	Assumes compliance with biological opinions and other environmental documents for contracting.	Assumes rewording to add requirement contractor is within legal authority to implement.
	No similar provision.	Assumes that current operating policies strive to minimize impacts to CVP water users
Time for Delivery of Water	Assumes methods for determining timing of deliveries	Assumes methods for determining timing of deliveries as in existing contracts
Point of Diversion and Responsibility for Distribution of Water	Assumes methods for determining point of diversion	Assumes methods for determining point of diversion as in existing contracts
Measurement of Water Within District	Assumes measurement for each turnout or connection for facilities that are used for all water supplies	Same as IRC
Rates and Method of Payment for Water	Does not include Tiered Pricing. Assumes advanced payment for rates for 2 months.	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for 2 months.
Non-interest Bearing Operation and Maintenance Deficits	Assumes either there is no non-interest bearing deficit or that agreement is in place to retire any non-interest bearing deficit.	Assumes language from existing contracts
Sales, Transfers, or Exchanges of Water	Assumes sales, transfers or exchanges with others. Does not discuss rates applicable to such actions.	Assumes continuation of transfers with rate for transferred water being transferor's rate adjusted for additional or reduced costs related to transfer and adjusted to remove any ability to pay relief.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Cross Valley Contractors
Application of Payments and Adjustments	Assumes refund of overpayment after satisfaction of any accrued indebtedness upon contractor request.	Assumes minor changes associated with methods described for overpayment including requirement for \$1,000 or greater overpayment for refund.
Temporary Reduction - Return Flows	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.
Constraints on Availability of Project Water	Assumes that current operating policies strives to minimize impacts to CVP water users	Same as IRC.
Unavoidable Groundwater Percolation	Assumes that some of applied CVP water will percolate to groundwater	Same as IRC
Rules and Regulations	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Water and Air Pollution Control	Assumes that CVP will operate in accordance with then existing rules	Same as IRC.
Quality of Water	Assumes that CVP will operate in accordance with existing rules without obligation to operate towards water quality goals	Same as IRC.
Water Acquired by the Contractor Other than from the United States	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Opinions and Determinations	Opinions and determinations not to be arbitrary, capricious or unreasonable. Parties may seek relief, adjustment, monetary damages if they are.	Assumes minor changes with respect to references to the right to seek relief
Coordination and Cooperation	No similar provision.	Assumes that coordination and cooperation between CVP operations and users should be implemented and CVP users should participate in CVP operational decisions. Parties retain exclusive decision making authority.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Cross Valley Contractors
Charges for Delinquent Payments	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Equal Opportunity	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
General Obligation	Assumes that CVP will operate in accordance with existing rules	Assumes that CVP will operate in accordance with existing rules, however assumes no requirement for contractor to levy in advance
Compliance with Civil Rights Laws and Regulations	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Privacy Act Compliance	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Contractor to Pay Certain Miscellaneous Costs	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Water Conservation	Assumes compliance with conservation programs established by Reclamation and the State	Same as IRC.
Existing or Acquired Water or Water Rights	Assumes that CVP will operated in accordance with existing rules	Same as IRC.
Operation and Maintenance by Non-federal Entity	Assumes non-federal entity will operate and maintain facilities and that certain payments to be made to that entity.	Assumes minor changes to language that would allow subsequent modification of operational responsibilities
Contingent on Appropriation or Allotment of Funds	Assumes that CVP will operate in accordance with existing rules	Same as IRC.

Provision	Existing -- Based on Interim Renewal Contract	Proposed -- Based on Final Negotiated Contract for Cross Valley Contractors
Sub-contractors	Subcontractors are as equally bound to meet the contract provisions as contractor	Same as IRC
Books, Records, and Reports	Assumes that CVP will operate in accordance with existing rules	Assumes changes for record keeping for both CVP operations and CVP users
Assignment Limited	Assumes that CVP will operate in accordance with existing rules	Assumes changes to facilitate assignments
Severability	Assumes that CVP will operate in accordance with existing rules	Same as IRC
Resolution of Disputes	No similar provision.	Assumes a Dispute Resolution Process
Officials Not to Benefit	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Changes in Contractor's Service Area	Assumes that CVP will operate in accordance with existing rules	Assumes changes to limit rationale used for non-consent with no set time limit for assumed consent
Notices	Assumes that CVP will operate in accordance with existing rules	Same as IRC.
Confirmation of Contract	Assumes that CVP will operate in accordance with existing rules	Assumes Court confirmation of contract and includes provision that contract not binding until court confirms is deleted.

COMMITMENTS FOR NEW AND CONTINUING ACTIONS

Reclamation and the Service have committed to numerous actions and processes in previous CVP water-related consultations that are associated with the renewal of CVP water contracts for the Friant Division and Cross Valley Unit. In addition, the Applicants (Fria Division and Cross Valley Unit) have committed to activities associated with long-term renewal of their CVP water contracts and are thus identified below. Those conservation actions that have been fully implemented are considered a part of the Environmental Baseline condition in Chapter 3 and will be used to complete this biological opinion. Conservation actions that are ongoing or continuing, and any new commitments as a result of this consultation process, are included in this Project Description. It is assumed that the commitments described in this Project Description will be fully implemented.

In the Friant opinion of 1991, each subsequent Interim water contract renewal opinion (1995, 1998, and 2000) and the Programmatic CVPIA opinion of 2000, Reclamation provided numerous conservation measures in their Project Description and agreed to certain Reasonable and Prudent Measures (RPM) as summarized on Table 1.8. These measures resulted in the development and implementation of long-term and short-term conservation programs to minimize the adverse effects of continued water delivery to Interim contract renewal water districts.

Reclamation implemented the short-term program to protect listed species within the Friant and Interim contractor service areas because it was determined development of the long-term program would take several years to complete. This short-term program was intended to be in effect until components of the long-term conservation program could be developed and implemented.

Reclamation cooperated with the Service, , in developing and implementing the long-term program to address the needs of listed species in the San Joaquin Valley. Reclamation and the Service identified a comprehensive approach to the recovery of all listed species throughout the San Joaquin Valley, including other Federal, State and local agencies willing to participate in its development.

Within the measures identified in the short-term and long-term programs, Reclamation committed to a process that will identify a comprehensive approach to recover listed species, with a Federal nexus to Reclamation, throughout the San Joaquin Valley. State, Federal, and private actions that adversely affect listed species can be mitigated by contributing to the long-term comprehensive program.

In the November 2000 programmatic opinion on *Implementation of the CVPIA and Continued Operation and Maintenance of the CVP*, November 21, 2000 (Service File No. 1-1-98-F-0124),

TABLE 1.8 Summary of Reclamation, Service, and Applicant New and Continuing Commitments Associated with Renewal of Friant Division and Cross Valley Unit CVP Water Contracts (1991 through 2001). (Commitments include mitigation/conservation measures, Reasonable and Prudent Measures, and Terms and Conditions from prior related consultations)									
2	1	1	1	1	Opinions				
0	9	9	9	9					
0	9	9	9	9					
0	8	5	1						
x	x	x	x	x	1. Develop a Critical Needs Plan identifying lands requiring immediate protection.				
				x	2. Assist the Service to develop and implement a Comprehensive Recovery Plan for all listed endangered species in the San Joaquin Valley.				
				x	3. Develop a cooperative agreement to include all entities whose activities affect listed species in the San Joaquin Valley.				
x	x	x	x	x	4. Issue notice of ESA requirements to CVP water contractors				
x	x	x	x	x	5. Identify and map endangered species habitat in CVP contractor service areas and provide to contractors				
x	x	x			6. Monitor land use change and ongoing activities within Districts receiving CVP water.				
x		x	x	x	7. Landowners obtain Service/Reclamation approval prior to taking actions on endangered species habitat with no Federal involvement.				
x				x	8. Ensure section 7 consultation on future actions impacting endangered species where there is Federal involvement.				
x	x	x	x	x	9. Develop a plan to compensate losses of endangered species habitat since 1991 for Friant and 1995 for Cross Valley.				
				x	10. Develop and Implement Conservation Plans				
x	x	x	x		11. Review and amend Water Conservation Plans to ensure consistency with ESA				
x	x	x	x	x	12. Develop a long-term program to address overall effects of the CVP and implementation of the CVPLA.				
x	x	x	x	x	13. Complete and implement an Operations and Maintenance for activities associated with CVP water delivery and use.				
x				x	14. Work with the California Department of Pesticide Regulation.				
x	x				15. Identify sources of selenium in wetland water supplies and assess selenium effects on aquatic species from agricultural drainage discharged into the San Joaquin River and Delta.				
x				x	16. Identify, analyze and compensate for past effects of contract service area boundaries changes, including inclusions and exclusions, since 1991 for Friant and 1995 for Interim contractors.				
x					17. Identify and analyze impacts of changes in purpose of use since 1991 for Friant and 1995 for Interim contractors				
x					18. Identify and analyze impacts of all water assignments executed since 1991 for Friant and 1995 for Interim contractors, and coordination on future assignments to ensure ESA compliance.				
x					19. Reclamation will apply applicable criteria to all water transfers.				
x					20. Develop and implement a Contingency Plan/Adaptive Management Program for implementing compensation commitments associated with losses of listed species habitat as a result of the delivery of CVP water.				
					21. Other conservation measures (New)				
				x	22. Curtail deliveries associated with discovery of conversion of native lands without consideration of ESA				

the Service and Reclamation agreed to numerous programmatic, comprehensive commitments that addressed future consultation, operation and maintenance, and conservation measures to minimize impacts to listed, proposed and candidate species. A complete list of the commitments from this programmatic opinion are found in Appendix B. Those commitments which more specifically apply to this Proposed Action are included later in this section.

The following Reclamation, Service, and Applicant commitments comprise conservation measures included in this Project Description. This consultation assumes these measures are fully implemented. Included with each commitment is the Service's assessment of their status (Status) and identification of those portions yet to be completed (Continuing Commitments). Reference is provided as to the origin (opinion) of each commitment.

1. Develop a Critical Needs Plan identifying lands requiring immediate protection.

- a. *The Service and Reclamation will develop a Critical Needs Plan that will identify those lands requiring immediate protection to assure the continued existence of listed species in the San Joaquin Valley. [1991 Friant Opinion - 1(a), and Reasonable and Prudent Measure/Term and Condition (3)]*

Status: It is the goal of Interior to assure that listed species are being recovered. For any species affected by the CVP that are continuing to decline, the Service and Reclamation immediately set out to assess critical needs for the species and determine whether it was appropriate to expand the Conservation Program or implement other *conservation measures*. Reclamation and the Service used the best scientific and commercial information available, in conjunction with data from Reclamation and Service-funded research and aerial photograph analysis to monitor trends in the environmental baseline for listed species. Funding to implement the identified critical need actions came generally from three sources: through implementation of section 3406b(1) "other" of the CVPIA, the CVP Conservation Program (CVPCP), and Federal reimbursable funding associated with CVP operations and maintenance activities. Appendix C provides a list of actions and funding sources of past and on-going projects to benefit listed species within the Friant Division and Cross Valley Unit service areas.

As directed by the 1991 Friant and Interim biological opinions, the Service identified, and Reclamation implemented critical needs for listed, proposed, and candidate species impacted by the CVP. Critical needs plans were drafted for Friant and Interim biological opinions and that information was incorporated into the *Recovery Plan for Upland Species of the San Joaquin Valley, California*. The Recovery Plan was written to help identify recovery needs for listed species in the San Joaquin Valley and was largely funded by Reclamation water users in the Friant Division with some funding by the CVPIA (b)(1) "other" Program and Reclamation. Critical needs planning associated with species on Friant Division lands has made significant progress. Reclamation's South-Central California Area Office (SCCAO) continues to provide funding to collect data on critical

needs species to meet obligations under the Friant biological opinion. Since the 1991 Friant opinion, numerous projects were developed and implemented to various degrees based on funding originating generally from the three sources identified above. Reclamation and the Service are continuing to update and address critical needs for listed species survival for all listed species impacted by the CVP. The last update of high priority species was provided by the Service to the Conservation Program team on January 27, 2000. Reclamation provided a table to the Service of the Conservation Program's FY 2000 Projects and b(1) other FY2000 Projects on July 7, 2000.

CVP Conservation Program (CVPCP) and 3406(b)(1) "Other". The CVPCP is a long-term program designed to meet the needs of special status species in the areas affected by the CVP. Reclamation is focused on providing the necessary resources for successful implementation of this program. In this regard, Reclamation has funded one full-time employee dedicated solely to the implementation of the CVPCP, and has initiated the funding process to support the program. Reclamation's annual budget includes approximately \$2.4 million for implementation of the CVPCP, and a similar amount of funding is being requested in subsequent budget proposals.

In addition to the CVPCP, Reclamation and the Service have developed a program under section 3406(b)(1) of the CVPIA to mitigate for past impacts of the CVP not specifically identified in section 3406 of the CVPIA. The (b)(1) "other" Program (otherwise known as the Habitat Restoration Program) is responsible for mitigating for adverse environmental impacts. The Habitat Restoration Program contributes between \$1 million and \$2.5 million annually toward critical needs species and habitat restoration activities and a similar or greater amount of funding is being requested in subsequent budget proposals.

O&M Reimbursable Funds. Funding for site-specific ESA projects may be budgeted under O&M funding to address needs that may not be met by CVPCP and (b)(1) "other" funds. Reimbursable funding from implementation of the 1991 Friant biological opinion was used initially because the CVPCP program and (b)(1) "Other" had not yet been established as funding sources.

Continuing Commitments: Reclamation and the Service commit to continue updating and implementing critical needs for listed species survival for all listed species impacted by the CVP. Reclamation and the Service will pursue adequate funding and partners to implement critical needs actions identified through this process. Reclamation and the Service are continuing to pursue adequate funding and partners to implement critical needs actions identified through this process. Habitat mapping efforts identified in Item 5 below will be used to identify and prioritize lands for future acquisitions/easements.

Funding Priorities. As in previous years, the species which will benefit from this program will be those having critical needs as identified during the ESA Section 7 consultations, including the Long-term Renewal Water Contracts, and any other biological opinions that

are in effect for the Friant Division and Cross Valley Unit water contractors. The Adaptive Management Committee (explained below) will continue to review the critical needs species and establish priorities for funding.

As part of the Interim and Friant biological opinions, Critical Needs Plans were written and that information was incorporated into the *Recovery Plan for Upland Species of the San Joaquin Valley*. The biological opinion programs which were committed to by Reclamation includes the stipulation that Reclamation would address the entire San Joaquin Valley.

In addition to projects funded by the Habitat Restoration Program, and as part of the commitment to implement the Interim biological opinion, Reclamation is reviewing existing information and sponsoring research on the presence of threatened or endangered species across the San Joaquin Valley, as funding permits. Projects include ongoing efforts to document the historic and current geographic distribution and population numbers of San Joaquin kit foxes, with a goal to identify and enhance corridors to allow passage between northern and southern California. Efforts have focused on assembling records not represented in the California Natural Diversity Data Base (NDDDB), and also on mark and recapture population studies. Products resulting from these studies will include updated maps and NDDDB records for the species completed, and annual reports. These projects will be part of the greater interagency cooperative effort to identify and enhance corridors for passage of kit foxes between northern and southern California.

Reclamation has provided funding for comprehensive recovery work for the kit fox, focusing on the development of wildlife corridors through areas where increasing pressure from development are expected to occur, and with Reclamation facilities in the area. Development of wildlife corridors is contingent on acquiring facts about the species anticipated to use the corridor. Reclamation has also provided funding for studies of kit fox use of agricultural land, and use of urban land (including canal rights-of-way) in Bakersfield, California. Much valuable information has been collected by these studies, and future management decisions will be able to use this information upon which to base their decisions. Future studies will be conducted as appropriate and as determined by the Adaptive Management Committee.

As discussed previously, projects associated with the Friant and Interim biological opinions include conducting various surveys to locate additional populations of sensitive, threatened, and endangered species. Surveys conducted in FY 1998 resulted in the discovery of the second known population of a rare plant: Keck's checkerbloom (*Sidalcea keckii*). Subsequent funding from the CVPIA (b)(1) "Other" program allowed seeds to be collected and placed in a seed bank in the event of possible destruction of the original plant population. A coordinated effort with the Sierra Foothill Conservancy (Conservancy) and funding from the CVP Conservation Program and the Conservancy has made it possible to secure and protect 1,500 acres for Keck's checkerbloom.

Reclamation and the Service are working with other agencies to develop and implement a fire management plan for one of the only known population of the brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*), and has been conducting surveys to locate additional populations. Reclamation and the Service are leading partners in the development of a captive breeding program for riparian brush rabbits.

Reclamation commits to continuing the effort to identify and address critical needs species with a nexus to Reclamation. Reclamation is also making a continued commitment to involve other agencies (Federal, State, and local entities) in efforts to cooperatively address the needs of listed species. This will result in cost savings to all involved, will avoid duplication of effort, and will result in an improved cumulative benefit to species.

- b. *Reclamation will identify lands that are critical to the continued survival of listed species and proposed species.* [1995 and 2000 Interim Opinions - 3(a)]

Status: Reclamation and the Service undertook a public process in 1995 to identify critical needs of species affected by the CVP (including Interim and Friant Division contractors) and to develop and implement a critical needs plan to address identified critical needs. Meetings were held on the giant garter snake, San Joaquin kit fox, large-flowered fiddleneck, California red-legged frog, contaminants, El Dorado County chaparral plants, palmated-bracted bird's beak, and vernal pool species. Reclamation and the Service agreed that high priority items would be best addressed in the context of a CVP-wide conservation program.

Reclamation and the Service developed the CVP Conservation Program as one of the means to offset the effects of the CVP on endangered species. During the consultation on Friant Division water contract renewals, Reclamation and the Service agreed to work together to solve endangered species problems. The Friant and Interim biological opinions specified that Reclamation and the Service would identify critical needs of the species. With time, it became clear the list of conservation actions to be done changed each year with new information. At the time of the Interim Water Contract Renewal consultation, Reclamation and the Service agreed to annually reexamine the list of actions to be done and identify which ones had the highest priority. This would ensure that important problems were not missed and that money would be used effectively to solve problems. The CVP Conservation Program Framework Document was written to confirm the strategy. All of the species in the area affected by the CVP were included because spending decisions would be done most cost-effectively during the prioritization process. Participation by both agencies would ensure that the interests of Reclamation and the Service would be considered in all decision-making.

The Conservation Program, along with other initiatives [e.g., (b)(1) "other" Program, acquisition of level 2 and level 4 Refuge Water Supplies, and the Wetland Development Program] are intended to ensure that the existing operation of the CVP and implementation

of the CVPIA would not jeopardize listed or proposed species or adversely affect designated or proposed critical habitat.

Continuing Commitment: Reclamation and the Service commit to **continue updating and implementing** critical needs for the survival of all listed species impacted by the CVP. Reclamation and the Service will pursue adequate funding and partners to implement critical needs actions identified through this process.

- c. *Reclamation, working with the Service, will implement critical needs plans [1995 and 2000 Interim Opinions - 3(b)].*

Status: Critical needs plans were drafted for Friant and Interim biological opinions. The Recovery Plan for Upland Species of the San Joaquin Valley, California was partially funded by the CVPIA (b)(1) "other" Program and Reclamation to help identify recovery needs for listed species in the San Joaquin Valley. Critical needs planning associated with species on Friant Division lands has made significant progress. Reclamation's south-central California Area Office continues to provide funding to collect data on critical needs species to meet obligations under the Friant biological opinion.

Continuing Commitment: Reclamation, as necessary, will expand their critical needs efforts to ensure the existing operation of the CVP (including Interim contractors) will not jeopardize listed and proposed species or adversely affect designated or proposed critical habitat.

2. Assist the Service to develop and implement a Comprehensive Recovery Plan for all listed species in the San Joaquin Valley.

- a. *The Service will develop a Comprehensive Recovery Plan that includes all listed endangered species in the San Joaquin Valley. Reclamation will assist in developing the recovery plan and its implementation. [1991 Friant Opinion - 1(b)]*

Status: See 1(a) above. The final *Recovery Plan for Upland Species of the San Joaquin Valley, California*, was released by the Service in 1998.

Continuing Commitment: Reclamation, if shown to be necessary, will assist in the development of new recovery plans if additional species are identified that may be affected by Reclamation's operation of the CVP.

- b. *Reclamation will, as a component of a broader planning program, implement items identified in the recovery plan that are Reclamation's responsibility. Also, Reclamation will cooperate in conducting the population viability analysis. [1991 Friant Opinion - 1(c)]*

Status: Reclamation has continued to implement items identified in the Recovery Plan in (a) above that are Reclamation's responsibility. Reclamation has shown a pro-active approach to this effort and has addressed species prior to their listing. Reclamation contributed significantly to the protection of the Keck's checker mallow by providing funding that was used to establish the only known protected population of the plant. Examples of Reclamation's actions were provided to the Service in the Program Implementation Progress Report, December, 2000, and are found in Appendix C of this Document.

Continuing Commitment: Reclamation will continue to implement items identified in the recovery plan that are Reclamation's responsibility. The adaptive management team will work cooperatively to continue this commitment.

3. Develop a cooperative agreement to include all entities whose activities affect listed species in the San Joaquin Valley.

- a. *Reclamation will work with the Service to develop a Cooperative Agreement to include all entities whose activities affect listed species in the San Joaquin Valley.* [1991 Friant Opinion - 1(d)]

Status: A single cooperative agreement did not prove to be an effective method to work with other agencies for a variety of reasons. However, Reclamation has used agency-specific agreements extensively with other agencies to jointly fund cooperative efforts to address species' needs in the San Joaquin Valley and in other areas of the CVP. This has proven to be a satisfactory approach.

Continuing Commitment: Reclamation will continue to seek cooperative efforts to address the recovery of species in the San Joaquin Valley. This will result in a cost savings for all cooperators as well as a more holistic approach toward listed species recovery.

4. Issue notice of ESA requirements to CVP water contractors

- a. *Reclamation and Service will issue notices to all Friant contractors regarding the imperative of protecting all remaining habitat of listed species in the Friant Service area within 30 days after receipt of the final Opinion.* [1991 Friant Opinion - 2(a), and Reasonable and Prudent Measure/Term and Condition - (1)]

Status: Complete on November 15, 1991, a notice was issued jointly by Reclamation and the Service to Friant Division contractors regarding the imperative of protecting all remaining habitats of listed species in the Friant service area.

- b. *Notify Districts regarding ESA requirements of the Interim opinion.* [1995, 1998, and 2000 Interim Opinions - 1(a)]

Status: Within the first year of the issuance of the 1995 Interim contract renewal opinion, Reclamation completed the following: included language in Interim contracts requiring

compliance with applicable biological opinions; sent a copy of the Interim contract renewal opinion to all 65 Interim contractors; and held workshops in Folsom, Kingsburg, Tracy, and Willows to explain the compliance requirements of the ESA.

Associated with the 2000 Interim contract renewal process, the Service and Reclamation believed additional communication was necessary with Interim (including Cross Valley Unit contractors) and Friant Division contractors to identify their obligations to comply with the ESA. As a result, Reclamation and the Service jointly developed and distributed a letter to "interested parties" on July 6, 2000, describing Interim and Friant Division renewal contractor requirements to comply with ESA. Further, existing language in the long-term contracts for Friant Division and the Cross Valley Unit (within this Project Description) includes the following, "The contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding execution of this contract undertaken pursuant to Section 7 of the ESA, as amended..."

5. Identify and map endangered species habitat in CVP contractor service areas and provide to contractors

- a. *Reclamation, in cooperation with Service, will initiate a comprehensive biological survey of Reclamation and private lands in the Friant service area to ascertain the distribution of all remaining habitat of listed species, and upon full implementation will notify all contractors of the location of wild lands suitable for listed wildlife species. [1991 Friant Opinion - 2(b), and Reasonable and Prudent Measure/Term and Condition (2)]*

Status: Reclamation, with the assistance of the Endangered Species Recovery Program (ESRP), initiated a comprehensive biological survey of Reclamation and private lands (with signed permission from landowners), in the Friant Division service area, to ascertain the distribution of all remaining habitats of listed species. Contractors who allowed surveys to be conducted were sent a letter stating the results of the surveys. Reclamation continues to conduct surveys on lands where appropriate and where signed permission is obtained from the landowner.

Continuing Commitment: Reclamation decided to continue this effort established with the 1991 Friant Division water contract renewal opinion and provide information to the water users and public on the significance of wild lands for the survival of threatened and endangered species.

- b. *Synthesize existing and new information on distribution and potential habitat of federally listed, proposed, and candidate species within the Districts. [1995, 1998, and 2000 Interim Opinions - 1(b)]*

Status: Reclamation, working with the Service, has entered "available information" into GIS format. Reclamation is working on combining the Service's species data base with databases from CDFG and CNPS.

Continuing Commitment: The Service and Reclamation have determined that additional work on this mitigation measure is needed and is better defined in the status and commitments section of 5(c) and (d) below.

- c. *After the information in item [(a) and (b) above] is developed, Reclamation and the Service will provide maps delineating the endangered species habitat to each Contractor for their service area.* [1991 Friant Opinion - 2(c)]
- d. *Map (hard copy and digitized) habitat and potential distribution of listed, proposed and candidate species, and provide information to the Districts, the Service, and the California Department of Fish and Game.* [1995, 1998, and 2000 Interim Opinions - 1(c)]

Status: Progress was made on these commitments from the 1991 Friant Division and the 1995, 1998, and 2000 Interim contract renewal opinion processes. Maps were included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California*. However, the maps were insufficient to fulfill the complete needs of the action.

Continuing Commitment: Reclamation and the Service have committed to complete the following related activities prior to the end of FY 2003. :

- Establish listed and proposed species habitat baseline and estimated trends for Interim water contract service areas and the Friant service area ;
- Establish listed and proposed species habitat baseline for Friant water contract service areas;
- Notify contractors in writing of the listed and proposed species habitat within contract service areas;
- Establish listed and proposed species habitat baseline within CVP contract service areas;
- Calculate and compile a report showing trends in listed and proposed species baseline habitat for the Friant and Interim water contract service areas and the other combined CVP contract service areas.

In addition to continuing commitments identified for mapping of habitat and potential distribution of listed, proposed, and candidate species associated with the 1991 Friant opinion, the following provides additional information and commitment.

Reclamation and the Service have committed to developing a Comprehensive Mapping Program, consistent with existing biological opinions including the Friant and Interim contract renewals, to identify remaining natural habitats within CVP service areas and

identify any changes within those habitats that have occurred between 1993 and 1999. Reclamation will seek funding for this program.

To be consistent with the 1991 Friant biological opinion, and its 1992 amendment, and subsequent Interim contract renewal opinions, Reclamation will complete comprehensive mapping of all lands in CVP service areas to identify all remaining potential habitat for listed species by May 2002. The mapping, so generated, will be used to assess impacts to listed species. Reclamation and the Service are actively developing a mapping strategy. Contractors subsequently will be notified of the location of wildlands suitable for listed species.

Reclamation will work with and provide support to the Service to map listed species baseline habitat, or will contract with a Service approved party that has sufficient local area expertise to complete the mapping. The maps will consist of a GIS layer of potential habitat for each identified listed or proposed species. The use of additional data (including satellite imagery, other aerial photographs, soil maps, vegetation maps, etc.) may be necessary to help identify suitable habitat. Reclamation will ensure that mapped listed species baseline habitats are digitized and will provide the digitized layer to the Service or fund the Service to digitize the maps. Using the digitized data, the Service will provide Reclamation, the water districts, any member agencies, planning departments of cities and counties within the water districts, and other responsible parties copies of maps of potential habitat for listed species.

By May 2002, the three phases described below will be completed. Once the habitat is located and quantified, CVP Contractors and State and local agencies with jurisdiction over land use planning decisions will be notified of the comprehensive three phase mapping strategy. Mapping will be used to quantify listed species habitat within the service area of the water districts.

Habitat Monitoring Three Phase Program:

Phase I - A 1993 landcover database or basemap will be developed using the best available existing landcover data and satellite imagery. Classification of land or habitat types represented in the CDF&G/Ducks Unlimited database will be used for wetland types, and WHR (Wildlife Habitat Relationships) classification types will be used for upland types. Classification types will be correlated with the National Biological Diversity Database for determining species habitats. As part of Phase I, a demonstration area will be chosen to develop and test methods, procedures, and products.

Phase II - will determine areas of habitat change by comparing 1993 image data to year 2000 image data. Based on available GIS datasets and spectral change analysis, a preliminary change map will be created to guide sampling and remapping efforts in phase III.

Phase III - will create an updated landcover database representative of landcover and habitat conditions for year 2000. This process may include:

- Field sampling to determine the cause of change and identification of habitat types in change areas.
- Acquisition of large scale, orthorectified digital aerial photography for verification and remapping purposes.
- Additional mapping efforts in areas where existing datasets from 1993 are not adequate to meet the needs of this project.
- GIS analysis for habitat change monitoring

Additionally, Reclamation and the Service commit to revisit and update the land cover database for year 2000 every 5 years for monitoring and trends analysis purposes.

6. Monitor land use change and ongoing activities within Districts receiving CVP water.

- a. Monitor land use changes and ongoing activities in the Districts to ensure that project water is not used in a manner that adversely affects listed, proposed, and candidate species.*
[1995 and 2000 Interim Opinions - 1(d)]

Status: To date limited progress had been made on this measure. However, the mapping efforts which have just begun will assist the ability to monitor land use changes.

Continuing Commitment: Using data from the Comprehensive Mapping Program and aerial photo analysis, Reclamation will work with the Service to develop a Land Use Monitoring and Reporting Program soon as technically possible. Data from the monitoring will be used to update the environmental baseline, assess impacts of Reclamation actions on listed species, and determine compensation measures

Reclamation commits to the development and implementation of a Land Use Monitoring and Reporting Program, as funding and authorizations allow. Reclamation will seek base funding for this program.

Reclamation will work with the Service to provide maps produced as a result of the Land Use Monitoring and Reporting Program as soon as technically possible, to CVP water districts and county planning departments including updates of any new data from the Service.

The Land Use Monitoring and Reporting Program will be implemented immediately to test and track, for the purpose of validating over the life of the project, the assumptions made in this biological opinion that the baselines of the species on Table 1.1 are stable or increasing.

Monitoring will be used to assess the condition and impacts of Reclamation actions on listed species. Reclamation and the Service are actively developing a monitoring strategy based

on the comprehensive mapping program. The land cover database for year 2000, described in Phase III above, will be revisited every 5 years for monitoring purposes.

One use of this program is that changes and trends in potential listed species habitat will be reviewed by the CVP Conservation Program's technical team and will be used to determine the effectiveness of the CVP Conservation Program and other local planning efforts in protecting and recovering listed species. This will help focus conservation efforts on acquisition needs with the highest priority. In addition, the team will identify other priority needs that are not habitat related. As needs for information gathering or additional interagency coordination needs are identified, the Service and Reclamation will put programs in place or bolster existing programs to meet those needs.

Reclamation and the Service will use the best scientific and commercial information available, in conjunction with data from aerial photograph analysis to monitor trends in the environmental baseline for listed species. It is the ultimate goal of Interior to assure that listed species are being recovered. For any listed species affected by the CVP, the Service and Reclamation will immediately assess its critical needs and determine whether the existing Conservation Program needs to be expanded to address the identified critical needs or if implementation of conservation measures would be adequate. The conversion of native habitat to agricultural or municipal/industrial uses within contractor service areas, without prior biological surveys as required by Reclamation prior to the delivery of CVP water, will be evaluated to determine required mitigation.

7. Landowners obtain Service/Reclamation approval prior to taking actions on endangered species habitat with no Federal involvement.

- a. The Service and Reclamation will notify the Contractors of the procedures to be followed if their actions will have impacts on endangered species habitat lands in cases where there is no Project water involved. [1991 Friant Opinion - 2(d)]*
- b. Reclamation, working with the Service, will develop and distribute to the Districts and landowners guidance on construction and maintenance activities that are most beneficial to listed, proposed, and candidate species. Complete within 1 year of contract renewal. Reclamation will commit to completing site-specific operations and management plans and distributing them to District's within 1 year of this opinion. [1995 and 2000 Interim Opinions - 2(b)]*

Status: Reclamation did provide notice to Friant and Interim contractors regarding their responsibilities associated with the ESA (identified in 4 above) and has written 3 CVP-wide documents that constitute an O&M Plan:

- Operation and Management Plan: an Overview;
- Operations and Management Plan: Field Manual;

- Operations and Maintenance Plan: Sensitive, Threatened, and Endangered Species.

This “plan” will cover associated Operations and Maintenance activities on landowners, district, and Reclamation lands. Each Area Office is developing site specific operations and management plans and these plans will be made available to water contractors and managing partners.

Continuing Commitments: Implementation of this measure is progressing, but is behind the schedule as provided within the Interim contract renewal opinion, (b) above. Reclamation will commit to completing site-specific operations and management plans **within 1 year of this opinion**. In addition, manuals will be distributed to Districts and managing partners **within 1 year of this opinion**. Additionally, Reclamation continues to work with water districts for the completion and implementation of agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).

8. Ensure Section 7 consultation on future actions impacting endangered species where there is Federal involvement.

- Reclamation and Service will notify Contractors of the procedures to be followed if their actions will have impacts on endangered species habitat lands in cases where the use of project water is contemplated. [1991 Friant Opinion - 2(e)]*

Status: As per Item 4, Friant Division and Cross Valley Unit contractors have been notified regarding their requirements to comply with ESA, including those pertaining to the delivery of CVP water supplies. Further, existing language in the long-term contracts for Friant Division and the Cross Valley Unit (this Project Description) includes that, “The contractor shall comply with requirements applicable to the Contractor in biological opinion(s) prepared as a result of a consultation regarding execution of this contract undertaken pursuant to Section 7 of the ESA, as amended...” The Friant Division and Cross Valley Unit CVP water contractors, whose contracts are currently up for renewal, have also made “Applicant Commitments” that they will not deliver CVPIA Project Water for the purpose of converting any native lands to agricultural or M&I uses unless and until appropriate ESA compliance has determined that such conversion will not likely affect protected species or appropriate mitigation has been provided (Item 22).

Continuing Commitment: Procedures will also be included in the Operations and Maintenance Plans discussed in Item 13.

9. Develop a plan to compensate losses of endangered species habitat since 1991 for Friant and 1995 for Cross Valley.

- a. Reclamation will develop a Compensation/Implementation Plan in cooperation with Service. The objective of this plan will be to offset impacts to endangered species that occur within the Contractor's service area between 1/1/91 and the date of the notice in Item 4 above. [1991 Friant Opinion - 2(f)]*

Status: Reclamation determined the amount of habitat lost between 1/1/91 and the date of the notice in Item 4. By agreement between Reclamation and Service, resolution of the amount of acreage necessary to mitigate converted areas has not been finalized and is pending development of policy to address such land conversions. That development effort is in progress, and its implementation will be included in efforts associated with the Contingency Plan/Adaptive Management Program as defined in Item 20.

In the quarterly Interim Opinion Status Report Tables received by the Service on July 7, 2000 and October 19, 2000, Reclamation noted the contingency plan to address impacts to species or their habitats within the Interim and Friant Division's contract service area was "in development".

Continuing Commitments: Reclamation will finalize and implement the policy on land conversion as mentioned in (a) above. Reclamation and the Service will agree upon an appropriate mitigation for the lands converted from April 1990 (closest date of available photos to January 1991) to October of 1992. Reclamation will finalize these compensation measures, in coordination with the Service, within 3 months of this opinion and will ensure completion of these measures within 3 years of this opinion.

Reclamation and Service have agreed that conversions of habitat within the Friant districts that have occurred from 1991 to present, and Cross Valley districts from 1995 to present, will be identified as to owner, number of acres and type of habitat that was converted. Compensation for those conversions can take the form of, but is not limited to, protection of native habitat by fee title acquisition, conservation easement, land retirement, and enhancement of existing preserved land (upon approval). The form of compensation shall be formalized through written agreement between the contractor and Reclamation.

Guidelines to address compensation for conversion of native habitat are being developed to address the conservation requirements applicable to the use of CVP water associated with conversion of land from native vegetation to agricultural, municipal, or industrial development within the CVP service area administered by the South-Central California Area Office of Reclamation. Conversion of such land has the potential for destroying endangered or other sensitive species habitat, and if such conversion is facilitated by the delivery of CVP water, any loss of endangered or other sensitive species habitat must be avoided

through a mitigative action. Mitigation in this reference is taken to mean avoid, minimize, and compensate.

Conversion of endangered or other sensitive species habitat associated with CVP water deliveries may continue in the future. Reclamation and the Service believe landowners implementing these types of land conversions, should they occur, must provide compensation through preservation and restoration/creation. To provide an incentive for landowners to furnish the conservation measures in good faith, the ratio of the compensation can be reduced when considered in the context of location. This ratio reduction would have to be evaluated on a case-by-case basis by the Service.

The conservation guidelines will meet commitments made by Reclamation under the 1991 Friant opinion and Term and Condition V of the 2000 Interim Opinion and will be the standard approach applied for endangered or other sensitive species habitat where there is a nexus of present or future delivery of CVP water in the San Joaquin Valley. The guidelines will be reviewed every three years and changes will be made and implemented as appropriate.

10. Develop and implement Conservation Plans

- a. An Interim Conservation Plan will be developed and implemented to avoid adverse effects on listed species and their habitat until the long-term program identified in Item 12 is developed. The Interim Conservation Plan will consist of three components. First will be an expanded Compensation Plan which will include appropriate compensation under Items 16(a) and 16(b). Second will be the identification of critical endangered species habitat lands within the Contractor's service area. Third will be the development of a Cooperative Agreement to implement the Interim Conservation Plan. [1991 Friant Opinion - 2(g)]*

Continuing Commitment: As a component of their endangered species conservation program, Reclamation will identify and manage Reclamation lands for endangered species purposes consistent with CVP operations. Most other items considered in associated planning efforts within Items 1-24 could be a part of the long-term Conservation Plan.

11. Review and amend Water Conservation Plans to ensure consistency with ESA

- a. Reclamation will review water conservation plans for the Districts prior to implementation to ensure they do not adversely affect listed, proposed or candidate species. [1995 and 2000 Interim Opinions - 2(c)]*

Status: The first Status Report for the Interim opinion noted that all water conservation plans for Interim contracts were reviewed prior to implementation. Reclamation determined that no activities implemented during the first year would affect listed species. (Also see status of Item (b) below).

The CVPIA requires that all surface water delivery systems with its [district] boundaries are equipped with water measuring devices or water measuring methods of comparable effectiveness acceptable to the Secretary. The conservation criteria have requirements that Districts have appropriate water measurement devices. All District conservation plans have been deemed consistent with the Reclamation's criteria.

The Water Management Plan *Criteria* are due to be revised in 2002 in conjunction with the CVPIA requirement that no later than every 3 years the *Criteria* be changed or amended. This was last done in 1999. Reclamation has initiated informal consultation between its Region area office Water Conservation Specialists and the Service regarding changes suggested for the revision of these *Criteria*. Sacramento office of Water Conservation has concurred that the Service will be contacted and included in the revision of current Water Conservation Plan Criteria as part of the Adaptive Management Plan committed to by Reclamation. These discussions are now ongoing and Service will be asked for their input on revisions and/or existing criteria and how they may affect ESA issues. This informal discussion with Service will begin immediately upon the date of this Opinion.

On July 7, 2000, Reclamation provided the Service with the following water conservation plan information:

- Water Management Plan Information - Zip drive containing the 2000 implementation plans/reports and the current Water Management Plans;
- Notice of "3 Public Workshops" to assist water contractors in meeting the 1999 Standard Criteria;
- Reclamation's Standard Criteria for Evaluating Water management Plans, 1999
- Interested Parties Letter for review of draft "Criteria for Evaluating Water Management Plans 1999" Public Notice;
- CUWCC Annual Report - 1999
- "Water Management Planning in the Central Valley Project" developed to meet the 1996 Standard Criteria;
- Water management Planner: Guidebook, Plan Format, and Supporting Software developed to meet the 1999 Standard Criteria;

Continuing Commitment: Reclamation will coordinate with the Service on future water conservation plans and amendments prior to implementation to ensure that these plans comply with ESA. Conservation measures will be implemented by both Reclamation and the water districts to ensure that long-term use of contract water does not degrade baseline conditions of listed species.

- b. *Reclamation will amend the criteria for water conservation plans to ensure consistency with the ESA. [1995 and 2000 Interim Opinions - 2(d)]*

- c. *Reclamation will provide a status update May 28, 2000 regarding the water conservation criteria revision. By August 28, 2000, Reclamation will revise the criteria in coordination with the Service to ensure compliance with the ESA.* [2000 Interim Opinion - 2(d)]

Status: The criteria for evaluating water management plans was completed in September 1996. Comments from the Service were considered in developing the final criteria. However, although the criteria were earmarked to be revised to ensure that protection of listed, proposed, and candidate species during the April 1996 revision process, the annual status reports for the Interim opinion indicate that the revision was not completed.

On July 7, 2000, Reclamation provided the Service with the following water conservation plan information as referenced in (a) above.

Since the Interim Opinion of 2000 was issued, it was determined this effort had been completed in 1996. Reclamation has initiated informal consultation between its Region area office Water Conservation Specialists and the Service regarding changes suggested for the revision of these *Criteria*.

Continuing Commitment: **Within 6 months of this opinion,** Reclamation will revise the criteria in coordination with the Service to ensure compliance with the ESA.

12. Develop a long-term program to address overall effects of CVP and implementation of the CVPIA

- a. *Reclamation will develop and implement a long-term plan to prevent/minimize take and contribute to the survival of listed species throughout the San Joaquin Valley.* [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition - (6)]
- b. *Reclamation, working with the Service, will develop a long-term program to the address overall effect of the CVP and implementation of the CVPIA.* [2000 Interim Opinion - (4)]

Status: Reclamation has been undertaking actions that have significantly contributed to the survival of listed species throughout the San Joaquin Valley. Reclamation has also been implementing measures to prevent/minimize take of species through operations and maintenance actions.

The Service, with assistance from Reclamation, completed a biological opinion on the on the Implementation of the CVPIA and Continued Operations and Maintenance of the CVP. Reclamation's annual budgets have included approximately \$2.5 million annually since 1998 for critical needs.

Continuing Commitments: Reclamation and the Service will pursue adequate funding and partners to implement any requirements included in the final biological opinion on the Implementation of the CVPIA and Continued Operations and Maintenance of the CVP.

13. Complete and implement an Operation and Maintenance Plan(s) for activities associated with CVP water the delivery and use.

- a. *Reclamation, working with the Service, will develop and distribute to the Districts and landowners guidance on construction and maintenance activities that are most beneficial to listed, proposed, and candidate species. Complete within 1 year of contract renewal. [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition - (4), and 1995 and 2000 Interim Opinions - 2(b)]*

Status: Implementation of this measure is progressing, but is behind from the dated timeline of the 2000 Interim opinion. Reclamation, working with the FWS, completed operation and maintenance (O&M) manuals providing guidance on how daily activities can best be conducted with minimal impacts on sensitive species. The entire Operations and Maintenance Plan consists of four documents; this document, the *Operations and Maintenance Plan: Overview*, is intended for use in Management and Planning. The other documents *Operations and Management Plan: Field Manual*, *Operations and Management Plan: Site Specific Information and Procedures*; and *Operations and Maintenance Plan: Sensitive, Threatened, and Endangered Species* are designed to be taken into the field and used on a daily basis by operations and maintenance staff and resource staff. Each Area Office is developing site specific operations and management plans and these plans will be made available to water contractors and managing partners.

To compliment these documents, training is received by staff and contracted operations and maintenance staff concerning the identification, distribution, and habitats of endangered, threatened, and sensitive species. This training was originally provided by Reclamation but is now being provided by the Department of Pesticide Regulations. The Bureau of Reclamation will also assist water districts and private land owners receiving Bureau of Reclamation water in adhering to appropriate avoidance and mitigation measures by making copies of the documents available to them.

Continuing Commitment: Implementation of this measure is progressing, but is behind the date identified in the Interim opinion. As a result, Reclamation will commit to completing site-specific operations and management plans **within 1 year of this opinion**. For CVP Friant Division and Cross Valley Unit contractors, these consultation processes will involve Operation and Maintenance activities on Federal, District, and landowner facilities. Manuals will be distributed to Districts **within 1 year of this opinion**. Progress will be evaluated by the adaptive management team. Additionally, Reclamation continues to work with water districts for the completion and implementation of agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).

Operation and Maintenance activities have been addressed using a phased approach. Phase I consists of procedures which are to be followed on United States lands administered by Reclamation and were effective within three months of the date of the Friant biological

opinion. Phase II addresses the identification of sensitive sites and the creation of site-specific measures to avoid adverse impact to those species. Phase III addresses the establishment of Integrated Pest Management procedures and the implementation of erosion control plans on Reclamation lands (Integrated Pest Management procedures stress managing a pest's environment and using a minimum of pesticides). The schedule for beginning implementation of phase I was three months following the date of the Friant opinion. Full implementation of phases II and III was to begin by the end of 2001; Updates in procedures will be adopted as needed with a report of new implementation actions provided to the Fish and Wildlife Service annually.

Implementation of phases I-III of Operations and Maintenance activities will require tiered section 7 coordination. Incidental take associated with Operations and Maintenance activities on Reclamation and District lands is not covered by this opinion.

14. Work with the California Department of Pesticide Regulation (CDPR)

- a. *To ensure land use activities associated with CVP water will be addressed pursuant to ESA, Reclamation and the Service will work with the California Department of Pesticide Regulation (CDPR) to develop updated guidelines, Reclamation will provide a status report and will provide information to CDPR generated from mapping efforts described in Conservation Measure 1(c) of the Project Description. [2000 Interim Opinion - Term and Condition - I(A)]*
- b. *Reclamation with assistance from the Service will work with the California Department of Pesticide Regulation to develop guidelines and information addressing the effects of the application of pesticides to listed, proposed, and candidate species. [1995 and 2000 Interim Opinions - 2(a)]*

Status: Reclamation has provided information that The South Central California Area Office (SCCAO) and ESRP began working with the State of California Department of Pesticide Regulation (CDPR) in 1993 following implementation of the Friant opinion. By 1995, CDPR had developed a number of slide presentations for use in pesticide applicator training. SCCAO provided some slides to them that are being used as part of the slide presentations and are also in the set of informational cards produced by CDPR and intended for field use. Training by CDPR is provided at seminars for re certification for applicators and licensed pest control advisors. The website for CDPR which has extensive threatened and endangered species information that was developed in cooperation with Reclamation. The SCCAO is still actively working with CDPR and will be cooperating in the printing of additional cards and also in the development of new ESA information during FY 2001 and beyond.

Reclamation sent a 1-page memo to the Service on April 5, 2000 providing an update on their coordination with the California Department of Pesticide Regulation (CDPR). The memo noted that Reclamation has provided photographs of and information about listed

species to CDPR. In addition, the Fifth Annual Status Report on Annual Renewal Contracts received June 5, 2000 provided specific information regarding coordination between Reclamation's SCCAO and CDPR.

Continuing Commitment: Reclamation, working with the Service, will continue to provide information to CDPR generated from Item 5 above as information is generated and that new information will be provided to CDPR for posting on their web site for listed species information.

15. Identify sources of selenium in wetland water supplies and assess selenium effects on aquatic species from agricultural drainage discharged into the San Joaquin River and Delta.

- a. *Reclamation will prepare a study plan to identify sources of selenium contamination in the Grasslands, San Joaquin River, and the south Delta estuary. [1998 Interim Opinion - 3(b), and 2000 Interim Opinion Term and Condition II(A)]*
- b. *Reclamation will develop and implement a Service approved monitoring program to assess the effects of selenium loading within the San Joaquin River on aquatic listed species or their surrogates. [2000 Interim Opinion Term and Condition II(B)]*
- c. *If selenium concentration in refuge water supplies exceeds 2µg/l monthly mean standard for wetland supplies in the Grasslands, and this contamination is a result either directly or indirectly from Reclamations actions, Reclamation will identify and implement corrective actions and initiate separate formal consultation with the Service. [2000 Interim Opinion Term and Condition II(C)]*

Applicability to Consultation: While efforts to address the selenium issues in the San Joaquin Valley and Delta are underway, they are not germane to the renewal of the Friant Division and Cross Valley Unit CVP water contracts as neither area contributes significantly to the selenium problem in the ecosystem. Drainage problem lands generally do not exist in the Friant Division or Cross Valley Canal Contractor service areas or authorized place of use. At one time there were five (5) permitted agricultural drainage evaporation basins within the Alpaugh Irrigation District, a subcontractor to the County of Tulare Cross Valley Canal Contract. These basins were operated by Prose Farms, Inc., Bowman Farms, Inc., Morris and Sons Farms, Steve W. Martin Ranch, Inc., and 4-J Corp. The California Regional Water Quality Control Board-Central Valley Region has approved the final closure report for the Pryse, Bowman, Morris and Martin evaporation basins. It is schedule to consider the 4-J report at its January 2001 meeting. All of the basins are closed and have not been in operation for several years. No other drainage operations have or do occur in the Friant Division or Cross Valley Canal service areas.

16. Identify, analyze and compensate, if appropriate, for impacts of contract service area changes since 1991 for Friant and 1995 for Interim contractors.

- a. *Reclamation will identify and analyze the impacts of changes to contract service area boundaries since 1991 for any Friant contractors. Reclamation will fully compensate for any impacts associated with past changes to contract service area boundaries for the Friant Division. [2000 Interim Opinion Term and Condition III(A)]*
- b. *Reclamation will identify and analyze the impacts of changes to contract service area boundaries since 1995 for Interim contractors. Reclamation will fully compensate for any impacts associated with past changes to contract service area boundaries for the Friant Division. [2000 Interim Opinion Term and Condition III(B)]*
- c. *For inclusions or annexations involving the Interim and Friant contractors in this opinion that may affect listed species, Reclamation will initiate informal consultation with the Service. For those inclusions with direct or indirect effects that are likely to adversely affect listed species, or result in take, Reclamation will consult formally with the Service. Reclamation, through informal consultation with the Service, will determine if the inclusions or annexations will not affect listed species prior to signing of the FONSI or ROD. [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition (5) and 2000 Interim Opinion Term and Condition IV(E)]*

Status: Reclamation noted in their Quarterly Status Report Tables of July and October 2000 that identification and compensation of impacts related to changes in contract service areas will occur where applicable. Reclamation has records on file that all inclusions and exclusions occurring in the Friant and Interim water contractors service areas between 1991 and 1999 have received informal or formal consultation. Table 1.8 below, and Appendix D identify these areas of inclusion and exclusion in Friant and Interim water contractor service areas. The Service is unaware of any new inclusions or annexations in these areas since the February 29, 2000 opinion. An ongoing plan to compensate any losses to endangered species habitat that might result from the delivery of CVP water is being developed as described in Item 9.

Continuing Commitment: Reclamation will make a separate determination regarding the affect of these changes in contract service areas to threatened and endangered species and critical habitats pursuant to Section 7 or 10 of the ESA. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these contractor service area changes *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of this determination the Service believes effects related to these service area changes *may affect* federally listed species and/or their *critical habitat*, Reclamation shall initiate formal consultation under Section 7 of the ESA.

Table 1.8 Summary of Pre-CVPIA (1991) service area size and current (2000) service area size for the Friant Division, Cross Valley Water Service Contractors Districts and Friant Division Subcontractors. (Only those districts with boundary changes during the time period are included in table.)

Water Service District	No. of Acres Prior to CVPIA	Date of Change in Boundary	Current No. of Acres	Difference
FRIANT DIVISION CONTRACTORS				
Chowchilla ¹	82,829.7	5/99	85,619	2789.3
City of Lindsay W.S.A.	1,486	1/96	1,525	39
City of Orange Cove	867.8	2/96	959	91.2
Exeter I.D.	14,945.4	12/92	15,184	238.6
Fresno I.D.	247,874	3/94	247,870	(4)
Gravelly Ford W.D.	10,368.4	5/93	8,431	(1,937.4)
Shafter-Wasco I.D.	38,832.3	4/94	38,993.3	161
Southern San Joaquin MUD	59,939.5	8/94	61,618.7	1,679.2
Tea Pot Dome W.D.	3,608.5	5/93	3,570	(38.5)
Terra Bella I.D.	14,084.5	11/93	13,913	(171.5)
Tulare I.D.	73,610.8	1/96	73,508	102.8
Total Friant Division	548,446.9		551,191	2,744.1
CROSS VALLEY CONTRACTORS (and subcontractors)				
Alpaugh I.D.	11,993.1	7/93	11,832.2	(160.9)
City of Lindsay W.S.A.	Same as in Friant Division	1/96	Same	Same

¹There were three inclusions in Chowchilla Water Service District: one in 1998 and two in 1999

Table 1.8 Summary of Pre-CVPIA (1991) service area size and current (2000) service area size for the Friant Division, Cross Valley Water Service Contractors Districts and Friant Division Subcontractors. (Only those districts with boundary changes during the time period are included in table.)

Water Service District	No. of Acres Prior to CVPIA	Date of Change in Boundary	Current No. of Acres	Difference
Hills Valley I.D.	4,092.5	11/97	4,558	465.5
Kern-Tulare W.D.	22,110.6	8/98	21,698	587.4
Rag Gulch W.D.	6,005.1	7/94	5,998	7.1
Tri-Valley W.D.	4,560.6	6/97	2900.7	(1,659.9)
Total Cross Valley²	48,761.9		46,986.9	(1,775)
Grand Total	597,208.8		598,177.9	969.1

17. Identify and analyze impacts changes in purpose of use since 1991 for Friant and 1995 for Interim contractors.

- a. *Reclamation will identify and analyze the impacts of changes in purpose of use since 1991 for Friant contractors and 1995 for Interim contractors and provide this information and analysis to the Service, specifically analyzing how these changes will affect CVP-wide water supplies under drought conditions. [2000 Interim Opinion Term and Condition III(C)]*
- b. *Reclamation will provide the Service with an analysis of how future changes in purpose of use will affect shortages to districts, and how these changes in allocations will affect CVP-wide water supplies under drought conditions. [2000 Interim Opinion Term and Condition IV(B)]*
- c. *Reclamation will not execute future changes in purpose of use unless it can be shown that such changes will not reduce under drought conditions (beyond those predicted in the PEIS) water supplies for proposed or listed species. [2000 Interim Opinion Term and Condition IV(C)]*
- a. *Reclamation will consult on all future changes in water contracts from Agriculture only to Agriculture/M&I purposes. [2000 Interim Opinion Term and Condition IV(A)]*

²The City of Lindsay W.S.A. is a Friant Division and Cross Valley Contractor. Acreage is counted only in the Friant Division.

Status: There are no separate shortage provisions applicable to agricultural and M&I contracts in either the Friant Division or Cross Valley Canal contracts. In the case of Friant Division contractors, shortage allocations are determined by the class of water under contract (discussed below). For example, Class 2 contract water deliveries are reduced to zero before any reductions are imposed upon Class 1 contract supplies. This is true regardless of whether such contract water is delivered for use as agricultural or M&I water. With respect to Cross Valley Canal contract deliveries, all allocations are made based upon agriculture notwithstanding that some contract and subcontract deliveries are for M&I uses. In addition, no purpose of use changes have been executed for Cross Valley Contractors subsequent to 1995.

18. Identify and analyze impacts of all water assignments executed since 1991 for Friant and 1995 for Interim contractors.

- a. *Reclamation will identify and analyze the impacts of all water assignments executed since 1991 for Friant contractors and 1995 for Interim contractors and provide this information to the Service. Reclamation will fully compensate for any impacts associated with past water assignments of Interim and Friant Division water allocations. [2000 Interim Opinion Term and Condition III(D)]*
- b. *For assignments of Interim or Friant Division water that may affect listed species, Reclamation will initiate informal consultation with the Service. For those contracts or actions with direct or indirect effects that are likely to adversely affect listed species, or result in take, Reclamation will consult formally with the Service. Reclamation, through informal consultation with the Service, will determine if an action will not affect listed species prior to signing of the FONSI or ROD. [2000 Interim Opinion Term and Condition IV(D)]*

Status: In their Quarterly Status Report Table provided to the Service on July 7, 2000 and October 18, 2000, Reclamation noted that information gathering and data analysis for this term and condition is ongoing. Reclamation further noted that information will be provided in BA's for Long-Term Contract Renewal. Reclamation agreed to provide a draft program for compensation by September 2000. The Service has not yet received such a plan for compensation.

As part of this consultation, Reclamation provided the Service with information related to a water assignment from Atwell Island Water District to Hills Valley Irrigation District. In June of 1993 Atwell Island Water District (AIWD), along with Hills Valley Irrigation District, entered into a contract for Cross Valley Canal water (non-CVP water) with the County of Tulare. AIWD acquired an additional 954 acre-feet of CVP surface water supply from Tulare County for a total supply of 2009 acre-feet. In 1996 AIWD sold 2,921 acre-feet of capacity in the Cross Valley canal and permanently assigned 1959 acre-feet of CVP contract supply to Hills Valley for \$282 per acre-foot, or around \$825,000.

Since 1992, there have been no changes in the area of non-irrigated lands in Hills Valley. The 1993 annexation brought in an established citrus orchard. There is no evidence of any conversion of native, uncultivated land in Hills Valley associated with this assignment.

The Service is unaware of any new water assignments that have been executed since the February 29, 2000 Interim opinion.

Continuing Commitment: Reclamation will consult with the Service on future water assignments as they arise.

19. Reclamation will apply applicable criteria to all water transfers

a. Reclamation will apply the following criteria to all transfers and exchanges (from the date of this opinion up to long-term contract renewal) involving Interim or Friant Division contractors that have not already undergone section 7 consultation:

1. Transfers and exchanges will be executed for one year only for any district that does not have an established listed-species baseline as described in the draft biological opinion on operations and maintenance of the Central Valley Project (CVP) and implementation of the Central Valley Project Improvement Act of 1992 (CVPIA);

2. Transferred or exchanged water will be delivered and applied only to areas that were in cultivation from October 15, 1991 (the date of the Friant biological opinion), until one of the following occur and there is no net loss of potential listed-species habitat as a direct or indirect result of the transfer:

a. consultation on the effect of putting the area into cultivation has been completed, or,

b. there is an HCP in place that addresses impacts to the area receiving the water, or,

c. the CVP Conservation Program has a line-item, specific increase in funding to compensate fully for the transfer and is in place prior to the transfer.

3. All other non-historic CVP transfers and exchanges that do not meet the above criteria will require separate section 7 or section 10 authorization. [2000 Interim Opinion Term and Condition IV(F)]

Status: Reclamation has consulted on the following transfers since Interim contract renewal. These transfers were renewed for 1-year until listed species baseline could be established: Exchange Contractors Water Authority, Service File No., 1-1-I-00-1288; and Historic Inter-District CVP Transfers, Service File Nos., 1-1-I-00-1118 and 1-1-00-I-1024.

The effects on delta smelt of transfers involving CVP water delivered through the Delta Mendota Canal or San Luis Canal, wheeled through the CVP or SWP, and totaling up to 250,000 acre-feet annually were addressed in the 1995 OCAP biological opinion.

Continuing Commitment: For Warren Act, water wheeling, Surplus Flood Flow water contracts, and water transfers, Reclamation and the Service will establish a tracking program that assures compliance with the ESA.

The effects of additional transfers (i.e., exceeding a cumulative 250,000 acre-feet annually) on delta smelt, as well as the indirect effects of all transfers on terrestrial species, have not yet been addressed and will undergo consultation as may be required when such transfers are proposed. Because of the high number of transfers that occur annually, the Service and Reclamation are collaborating on streamlining the consultation process to allow for expedited consultation on water transfers.

20. Develop and implement a Contingency Plan/Adaptive Management Program for implementing compensation commitments associated with losses of listed species habitat as a result of the delivery of CVP water.

- a. Reclamation and the Interim and Friant Division contractors will establish a contingency plan that would develop and implement a process to identify impacts and address those impacts to listed species or their habitats within the Interim and Friant Division's contract service area occurring as a result delivering CVP water to the contractors. [2000 Interim Opinion Term and Condition V(A)]
- b. *Reclamation will ensure implementation of the contingency plan to address impacts to species or their habitats within the Interim and Friant Division's contract service area that occur without a Service incidental take authorization.* [2000 Interim Opinion Term and Condition IV(B)]
- c. *The contingency plan for impacts to listed species or their habitat will be reviewed in a Section 7 consultation with the Service and will incorporate compensation for temporal and other habitat losses. Losses of listed species habitat within the Interim and Friant contract service areas will be compensated at ratios consistent with the recovery needs for those listed species.* [2000 Interim Opinion Term and Condition IV(C)]

Status: This biological opinion addresses a broad range of species and habitat types throughout a large area, and encompasses numerous large-scale, long-term actions. In preparing the Project Description including the conservation measures, all parties have used the best available scientific information and collected input from a broad array of experts. However, it is likely that some aspects of the implemented conservation measures will fail to meet their objectives. Other measures that achieve some success may, nonetheless, not provide the best solutions to the problems addressed. Due to new information, specific objectives and conservation measures may change to provide for species critical needs. Finally, some measures may simply not be implemented as planned, or not implemented at all. The conservation measures above generally ascribe monitoring responsibilities and timelines.

In recognition of the uncertainties inherent in actions included in this Project Description, Reclamation has included provisions for monitoring and applying an adaptive management process. This process ensures that (1) measurable indicators of progress towards achieving all goals will be monitored, and (2) the process and conservation measures can be periodically modified as appropriate to consistently use the best information and most practical means for achieving conservation goals.

Types of Monitoring:

Three type of information will be gathered for monitoring progress and for adaptive management. Information from *compliance monitoring* will provide information on whether actions specified in the Project Description, including conservation measures, are carried out as specified. *Effectiveness monitoring* is designed to determine whether the conservation measures are effective in meeting their goals. These two types of monitoring together will provide overall direction on how effectively the conservation measures are implemented. The third type of information, derived from *species status* monitoring, will be used to help identify critical needs, evaluate progress towards recovery, and in some instances as an indicator of effectiveness.

Adaptive Management:

Information gathered from monitoring will be used to evaluate the effectiveness of actions in meeting specified goals, and adjust specific activities and priorities to provide for successful implementation of all conservation measures. Reclamation will establish and maintain an Adaptive Management Committee (AMC) to perform a variety of functions crucial to the successful implementation of conservation measures included in this and previous applicable biological opinions. The goal of the AMC is to identify, implement or guide implementation, and track the conservation measures. These actions could include the AMC ensuring that scientific advice is provided for funding, research, design, development, construction and implementation of conservation measures and protection arising under this biological opinion, such as Habitat Conservation Plans, Best Management Practices and contingency plans.

Functions of the committee shall include, but are not limited to:

- Track all actions undertaken by Reclamation as part of implementation of the Opinion.
- Seek partners to fund joint efforts to recover species in the San Joaquin Valley.
- Write proposals for funding of research or habitat acquisition from willing sellers.
- Undertake studies of threatened and endangered wildlife, plants and their habitat in the Friant Division and Cross Valley Unit.
- Develop information necessary to evaluate and monitor the effects of implementing Reclamation's water delivery efforts, and develop management practices that will benefit biological resources.

- Design, oversee and have available to the public the scientific studies and data analysis of all monitoring activities required under the biological opinion.
- Oversee the development of monitoring protocols for habitat delineation, land conversion, hazardous material and pesticide use.
- Oversee the results of all monitoring studies and water accounting with the goal of developing information to refine management actions that will benefit listed species.
- Oversee the development of best management agriculture practices, and evaluate projects which enhance, conserve and promote the recovery of listed species on agricultural land.
- Long term project evaluation (25+ years).
- Ensure that scientific information becomes available for use in the design, development, construction and implementation of projects associated with the implementation of the proposed action, including Habitat Conservation Plans, migration corridors, land retirement, water quality (selenium) and others.
- Reclamation shall provide to the AMC, for their evaluation and use, quarterly accounting of water deliveries, transfers, assignments, and water banking, including future actions proposed to Reclamation.

The AMC will consist of one each member from Reclamation, the Service, Friant Division and Cross Valley Unit. The Department of Fish and Game will serve in an ad hoc capacity and technical experts and others will be sought out as appropriate. Reclamation will serve as the chair of the AMC.

The AMC will strive to obtain consensus among members, however, all actions that may affect any listed species or their habitat shall require the approval of the Service. Information acquired from studies, data analysis such as GIS, or from other sources will be used for the following:

- The AMC may determine that some site specific actions may be affecting listed species and may recommend modification to water deliveries, adjust schedules or specify alternate resolutions.
- The AMC may determine that additional information or modification of conservation actions may be needed to avoid adverse effect to a species or to enhance recovery.
- The AMC may seek funding from a variety of sources by submitting a proposal to the CVP Conservation Program or to the CVPIA (b)(1) "Other" program to protect species or habitat with a CVP nexus.

All decisions made by the AMC which could reasonably be expected to affect threatened or endangered species must have FWS concurrence before implementation. The intent is to obtain concurrence from the Service without the need for a lengthy or frequent consultations.

The AMC may have meetings which are open to the public, with notices and agendas provided to all interested parties who request such notices. The public would be encouraged

to participate in this forum and shall be afforded the opportunity to comment on agenda items. The AMC shall report the results of monitoring studies and surveys, and seek grants and funds to enhance listed species.

The AMC will meet as often as needed but at least quarterly. Reports of monitoring studies, research, plan accomplishments and overall implementation of the conservation measures will be prepared by the AMC and submitted to the FWS annually.

Any decisions made by the AMC which deviate from measures delineated in the biological opinion, and which may affect listed species, must be approved by the Service before implementation. Service will require 30 working days to review AMC decisions and any supporting data.

Role of AMC in Endangered Species Compliance

Ultimately, the AMC will be the group designed to track implementation of conservation measures and to ensure that elements within this Project Description are implemented as described. In the event that information from monitoring or any other source indicates that any of the project elements necessary for ESA compliance are not being met or will not be met, notification will be provided by the agency which developed the information, to the AMC agencies, as appropriate. Upon notification, the AMC will meet promptly to identify and assess measures which can be taken to remedy any noncompliance or anticipated noncompliance with the conditions, and will immediately implement those measures. If the Service determines that a situation of noncompliance exists and the affected agencies are unable to remedy noncompliance within a reasonable time period that the Service prescribes, not to exceed 90 days, formal consultation will be reinitiated and the Service will issue a new or amended biological opinion with alternative regulatory requirements.

21. Other Conservation Measures

Conservation/Habitat Enhancement Measures

The Districts will notify Reclamation when they plan to develop projects for habitat enhancement on land which receives CVP water. Reclamation has informed the Districts that biologists on staff are available to assist with development of projects. Reclamation biologists can visit districts and attend meetings, if deemed appropriate, to help develop potential enhancement projects as part of Reclamation's commitments for this biological opinion.

Reclamation has committed to enhance habitat values on Federal land, where feasible. To accomplish this goal, Reclamation will work with the Authorities, individual Districts, and with the Service through the Adaptive Management Committee identified in Item 20. Reclamation is currently working on enhancement projects located on Reclamation canals

and other Federal property. Participation from the Authorities and Districts is crucial to making this program a success.

Enhancement projects can be located on Federal, District, or private lands, and the cumulative benefits can be substantial over time. Opportunities to work with farmers and develop possible habitat enhancements to their land is very important to conserving listed species.

There is great potential for agricultural lands in the Central Valley to play a substantial role in the recovery of listed species, if wildlife habitat improvements compatible with current agricultural practices are encouraged. Indeed, full recovery of some listed species is less likely to be possible if agricultural areas are not brought into improved compatibility with wildlife use. Specific wildlife habitat needs include areas for feeding, breeding, travel corridors and shelter, as well as providing benefits to general ecosystem function and stability.

A list of projects will be developed and reviewed by the Adaptive Management Committee. It is anticipated that projects on the list will be sorted according to various stages of development. Some projects will be only conceptual, some will be in beginning stages of implementation, others will be ongoing, and still others may be discarded as unfeasible for various reasons. Types of projects could include, but are not limited to:

- installation of guzzlers on rangeland to benefit bird populations,
- a commitment to delay hay cutting until bird nestlings have hatched, and
- provide escape dens for kit foxes to increase survival, especially in areas with non-native red foxes, coyotes, and feral dogs.

Because each improvement is cumulative, this will be a learning process where new potential projects will be made apparent as others are completed. The Best Management Practices will be updated to include new information as agreements are renewed with parties participating in the program. By working with Districts and individual landowners, it will be possible to learn things that would be difficult to acquire through studies alone.

Applicant-based Conservation Measures

All of the Friant Division and Cross Valley Canal Contractors operate conveyance facilities within their boundaries. Many also operate and manage water conservation and groundwater recharge facilities in order to implement their conjunctive use programs. These facilities are critical to efficient use of CVP water. Such facilities could be operated and maintained in a manner that benefits protected species. Managing the use of such facilities for multiple benefits to protected species sometimes may result in take of listed species even though such operation could provide an overall benefit to the species.

The Lower Tule River and Pixley Irrigation Districts are examples of Contractors with significant facilities in areas where substantial benefit could be provided to protected and other species. These Contractors own substantial lands used for groundwater recharge that could be managed in a manner that also benefitted protected and other species. The Contractors have been concerned about managing their lands in a manner providing species benefits because the intended recharge or other uses might be adversely affected by regulation of incidental take of listed species that might use the enhanced lands.

Similarly, many private landowners who receive CVP Federal water through implementation of the proposed contracts and deliveries have lands that they may wish to manage to benefit natural ecosystems and wildlife. Such conjunctively used lands may not have been managed for wildlife benefits to date because of concerns about liability for incidental take of listed species, either on enhanced lands or nearby areas used for non-wildlife purposes.

In order to encourage conservation actions and programs by the Contractors and private landowners that receive federal water, operation and maintenance plans or other conservation or habitat enhancement projects could be developed, as appropriate. At the Service's discretion, in the future such plans/projects ("conservation projects") can receive incidental take authorization by abbreviated consultation tiered off this biological opinion. Activities likely to have an appreciable net benefit to the listed species will be considered. This will benefit Districts and private landowners wishing to improve natural habitats on their lands, by providing a clear procedure and guidance to obtaining authorization for incidental take that might result despite overall benefits to protected species.

The following describes some of the information needs which will facilitate this process:

- The Service, the Reclamation and the Districts will meet within ninety (90) days of this opinion to begin to develop potential conservation projects;
- Reclamation will provide a map of all Reclamation lands and District lands within the Friant and Cross Valley service areas;
- Districts will coordinate with Reclamation and the Service at least ninety (90) days prior to undertaking conservation projects;
- At that time, the person or District proposing the conservation project will provide a complete description of the current management of the land and the proposed project, the anticipated results, appropriate maps and drawings of the lands/facilities to be beneficially operated and those adjacent lands that may be affected;
- Once the project is implemented, the person or District will cooperate with Reclamation and the Service in monitoring the benefits to protected and other species resulting from the conservation project.

San Joaquin River Restoration Efforts

Some of the original Friant Division Contracts were renewed in 1998. A coalition of environmental organizations led by the Natural Resources Defense Council (NRDC) challenged the adequacy of the environmental documentation supporting such renewals. Additionally, NRDC asserted that the California Fish and Game Code section 5937 is applicable to the operation of Friant Dam. NRDC and the Friant Division Contractors have entered into a stay and stipulation foregoing prosecution of the section 5937 claim for relief for the purpose of implementing a joint San Joaquin River restoration pilot program. The mutual goals and principles guiding this effort state a sincere desire by all parties to develop and implement a permanent river restoration program in settlement of the litigation.

22. Curtail deliveries associated with discovery of conversion of native lands without consideration of ESA

a. Applicant commitment to restrict delivery to areas converting native lands.

New Applicant Commitment: Contractors will not deliver CVP Project Water for the purpose of converting any native lands to agricultural or M&I uses unless and until appropriate ESA compliance has determined that such conversion will not likely affect protected species or appropriate mitigation has been provided.. The Contractors shall work with the Service and Reclamation to develop a standard definition of native lands for purposes of this consultation by May 1, 2001.

23. Reclamation will amend all long-term contracts to include penalty provisions prohibiting any unauthorized take, conversion of wildland habitat , etc., and provides that Reclamation shall terminate delivery of water to the Contractor until such time as the issue is resolved. [1991 Friant Opinion - Term and Condition (1)]

Status: Term and Condition (1) from the 1991 Friant biological opinion stated the following, "Prior to any final action on the renewal of any long-term water service contracts in the Friant Division, Reclamation shall issue a notice to all Friant contractors within 30 days after issuance of this biological opinion, specifying the prohibitions against take in the Act, and Reclamation requirements on the contractors to conform with provisions of the Act. Further, after the Record of Decision on the environmental impact statement is filed, scheduled for September 1993, all long-term Friant Division contracts that have been renewed with a right to amend (Article 14c) provision shall be amended by Reclamation to include penalty provisions that prohibit any unauthorized take, conversion of wildland habitat occupied by listed species, violation of the terms of the contracts pertaining to the conservation of listed species, or irrigation of lands that were not irrigated as of January 1, 1991, which in the opinion of the Service provide(d) habitat suitable for listed species. All such amendments also shall provide (a) that after issuance of the 24-month notices to the contractors specified under #2 below, delivery of Federal water is prohibited to lands supporting habitat suitable for listed species depicted on the maps attached to the 24-month notices unless clearance pursuant to the Endangered Species Act has been obtained from the

Fish and Wildlife Service; (b) the Contractor shall terminate immediately and automatically Friant water delivery to the landowner violating this stipulation until such time as Endangered Species Act compliance has been achieved to the satisfaction of Reclamation and the Service; (c) within 3 working days of discovery of the violations, the Contractor shall provide documentation to Reclamation and the Service that termination of water delivery has occurred and will not be reinitiated until Endangered Species Act compliance has occurred to the satisfaction of Reclamation and the Service; and (d) should the Contractor fail to terminate delivery to the landowner, Reclamation shall terminate delivery of water to the Contractor until such time as the issue is resolved to the satisfaction of Reclamation and the Service.

If the Record of Decision is not filed by September 1993, the need to amend the Friant Divisions contracts containing a right to amend provision by this date shall be examined to determine whether the terms and conditions are adequate to minimize the impacts of incidental take. All of the Friant Division long-term contracts that are renewed on or after the date the Record of Decision on the environmental impact statement is filed shall include the same provisions that are required by the preceding paragraph to be included in the renewed contracts which contain the right to amend."

Applicability to Consultation: This language is no long applicable to this long-term renewal process.

24. Reclamation shall consult with the Service on any deliveries of water using Friant facilities beyond that addressed in this biological opinion. [1991 Friant Opinion Reasonable and Prudent Measure/Term and Condition (5)]

Continuing Commitment: If deliveries of water using Friant Division facilities are proposed to occur beyond that addressed in this opinion, Reclamation will consult appropriately.

Additional Commitments Associated with Long-term Renewal of CVP Water Service Contracts

The following programmatic level commitments are from the consultation on the *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*, dated November 23, 2000. While most of the commitments in section VI of that opinion relate to the action of CVP contract renewal, the following more specifically apply to this proposed action.

1. Long-term contracts will be renewed, and Reclamation will complete tiered site specific consultations with the Service. No CVP water will be delivered or applied outside current contract service areas until either formal or informal consultation, as appropriate, is complete. Once formal site specific consultation has occurred that is in compliance with this opinion, it is

assumed that changes in land-use practices, and impacts to listed and proposed species, in the districts have been addressed.

4. Reclamation and the Service will write a joint letter to the water districts, any member agencies, Planning Departments of cities or counties within the districts using CVP water, and other responsible parties regarding requirements under the ESA. The letter will include: (1) a discussion of Reclamation's need to ensure that CVP water is not used in a manner which could jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated *critical habitat*, and (2) an explanation of the prohibitions described under Section 9 of the ESA in regard to *take*. The letter will discuss the appropriate protection measures as described here and in subsequent contract renewal consultation and will be completed within 60 days of execution of long-term contracts .

5. Conservation strategies will be in place for the districts or areas receiving CVP water. The types of strategies that could be accepted are: *Habitat Conservation Planning* as described in section 10(a) of the ESA; programmatic land management actions that include protection of listed and proposed species; requirements resulting from site specific Section 7 consultation; or an expansion of the existing CVP Conservation Program that adequately compensates for the direct and indirect effects of increased water delivery to an area.

6. Reclamation will, subsequent to a determination of *may affect* to listed species and/or adverse modification to designated *critical habitat* in consultation with the Service's SFWO Endangered Species Division, consult on all Federal actions that result in changes in purpose of use for CVP water contracts, including changes from Agriculture to Agriculture/Municipal and Industrial purposes.

7. The Service and Reclamation will work together to convey information to the water districts, and individual water users (as appropriate), on listed species needs. Reclamation will establish an outreach and education program, in collaboration with the Service, to help water users integrate implementation of the CVPIA and requirements of the contract renewal process as it relates to the ESA.

8. Interior will work closely with the water users, providing them maps of listed species habitats within their service-areas and guiding them through the consultation process to address site specific effects. Reclamation may encourage CVP contractors to complete HCPs encompassing the affected areas.

9. Reclamation and/or the Service will develop provisions for compensation for the loss of endangered species habitat resulting from the direct or indirect effects of a Reclamation action not covered under prior biological opinions that occur within the CVP service areas from the date of this opinion until completion of either: (a) contract area specific Section 7 consultation, (b) any other required site specific Section 7 consultation on the effects of the conversion in question, or (c) the completion of an HCP that encompasses the area in question.

10. Reclamation and CVP contractors will comply with all applicable opinions related to the CVP (listed in the Introduction to this opinion). Flow standards that form the environmental baseline of the 1995 OCAP biological opinion will be met, and Reclamation will take no discretionary actions (e.g. new contracts, contract amendments, facility construction) that would incrementally increase diversions and alter hydrologic and environmental conditions in the Delta until any required consultation is reinitiated and completed. (Appendix L, letter to the Service and NMFS from Reclamation, dated October 29, 1999.)

12. Reclamation, relative to all new and renewed water service contracts will informally consult with the Service's SFWO Endangered Species Division to determine the need for formal consultation prior to contract execution.

13. Reclamation will make certain that applicable measures to ensure ESA compliance for the renewal of CVP water service contracts are provided within the text of new and/or amended long-term water contracts and related actions.

14. Reclamation will provide information related to proposed new water assignments of Project water to the Service's SFWO Endangered Species Division prior to execution of the assignment.

Further Key Assumptions Relative to this Project Description

If this Project Description is not implemented as prescribed herein, or new information becomes available, consultation would be reinitiated to ascertain how the lack of implementation of any actions, or new information, affects the analyses and findings in this document. The following key assumptions and actions are considered relevant to this biological opinion and part of the Project Description and are therefore requisite in conducting the effects analysis and findings:

1. All conservation measures described in this Project Description will be implemented in the manner and schedule described. Reclamation, the Service, and the contractors, as applicable, will obtain sufficient funding to carry out their responsibilities in implementing these conservation measures.

2. Reclamation will implement the Project Description in a manner consistent with implementation of any listed species recovery plans, including the 1998 Recovery Plan for Upland Species of the San Joaquin Valley.

3. Interior will ensure full implementation of commitments and conservation actions described in the Preferred Alternative for Implementing the CVPIA, including:

- actions and programs as identified in the Proposed Alternative for implementing the CVPIA, including but not limited to: long term contract renewal, management of the CVP in a manner consistent with Interior's *Decision on Implementation of Section 3406(b)(2) of the Central Valley Project Improvement Act*, released on October 5, 1999; implementation of the (b)(1)"other" program; implementation of the Anadromous Fish Restoration Program; and provision of a firm water supplies to Central Valley wildlife refuges and wetland areas.
- activities, programs, and processes included in commitments for the 2000 biological opinion on *Implementation of the CVPIA and Continued Operations and Maintenance of the CVP*, section 2, VI. Reclamation and Service Commitments for New and Continuing Actions.

4. Reclamation and the Service will comply with all biological opinions related to the CVP, including but not limited to;

- flow standards that form the environmental baseline of the 1995 OCAP and Los Vaqueros biological opinions
- discharges into surface water bodies by CVP contractors resulting from CVP water impoundments and diversions will comply with the standards set in the biological opinion on the California Toxics Rule (number 1-1-98-F-21) in accordance with applicable implementation plans.
- commitments and conservation measures found in the biological opinion for the CALFED Bay-Delta Program (1-1-F-00-183)
- commitments and conservation measures found in the biological opinion on *Implementation of CVPIA and Continued Operations and Maintenance of CVP* (1-1-F-98-0124)

5. Reclamation will not implement additional discretionary actions (e.g., new contracts, contract amendments, facility construction) that would incrementally increase diversions and alter hydrologic and environmental conditions in the Delta beyond that considered in the existing OCAP until consultation on OCAP is reinitiated and completed.

6. Other CVP-related, non-CVPIA actions benefitting fish, wildlife, and associated habitats will continue, with at least current funding levels, including:

- implementation of the Central Valley Project Conservation Program
- implementation of the CVPIA (b)(1) "other" Program
- implementation of the Wetland Development Program
- implementation of the Comprehensive Mapping Program
- implementation of the Land Use Monitoring and Reporting Program
- continued Interagency Coordination for Ecosystem Protection

7. Water will continue to be delivered to CVP service contractors in quantities that approximate amounts provided in this project description. Reclamation and the Service will coordinate, for

ecosystem-level planning purposes relative to water deliveries to CVP contractors. Reclamation will provide information to the Service on annual deliveries each year, prior to or concurrent with informing the water districts of their allocation amounts. However, it is understood biological opinions for OCAP (1-1-94-F-70) and Los Vaqueros (1-1-95-F-117 and 1-1-95-F-134) are in place, and at no time can the total amount of these CVP deliveries exceed the total consolidated amount considered in these opinions. Further, individual tier water contract renewal processes will further address issues related to specific contract quantities as a part of their consultations under Section 7 the ESA. If Reclamation determines effects, including interrelated and interdependent effects, resulting from these CVP deliveries *may affect* federally listed species and/or their designated *critical habitat*, Reclamation will request consultation under Section 7 of the ESA. If, after review of annual delivery information provided by Reclamation (#2 above), the Service believes effects related to these CVP deliveries *may affect* federally listed species and/or their *critical habitat*, the Service will request Reclamation to initiate formal consultation under Section 7 of the ESA.

3. Status of Species and Environmental Baseline

Species Account

An abbreviated summary of species and baseline information is included in these accounts. For more detailed information on the biology and life history of these species, see the respective recovery plans for the individual species as referenced in the Literature Cited, Section 9. For a habitat-based baseline for the impacted area, see the Service's Biological Opinion on Operations of the CVP and Implementation of the CVPLA (Service file # 1-1-98-F-0124).

Aleutian Canada Goose (*Branta canadensis* spp. *leucopareia*)

Species Description and Life History: The Aleutian Canada goose was listed as endangered in 1967, and was downgraded to threatened on December 12, 1990 (55 FR 51106). Canada geese (*Branta canadensis*) have brownish grey bodies, darker wings, and black necks and heads with a distinctive white "chin strap." They range in length from about 22-45 inches. The Aleutian subspecies can be distinguished from most other subspecies by its small size (only Cackling Canada Geese are smaller) and a ring of white feathers at the base of black neck feathers in birds older than 8 months (USFWS 1991).

Historic and Current Distribution: Historically, the Aleutian Canada Goose was known to nest on most of the larger islands in the Aleutian Islands and in the Commander and northern Kuril Island chains. When the species was first listed as endangered in 1967, its only known nesting site was Buldir Island in the western Aleutian Islands, Alaska. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians, and Kaliktagik Island in the Semidi Islands.

In California, the Aleutian Canada Goose spends the winter on agricultural lands along the north coast, and throughout the Sacramento and San Joaquin Valleys. Major migration and wintering areas include agricultural lands north of Crescent City in Del Norte County, around the Sutter Buttes in the Sacramento Valley, near El Sobrante in Contra Costa County, and along the San Joaquin River between Modesto and Los Banos.

Reasons for Decline and Threats to Survival: The decline of this subspecies is largely attributed to predation resulting from the introduction of foxes and other small mammals to the Aleutian Islands during the period 1836 to 1930. At one time, recreational and subsistence take of this subspecies in the Pacific Flyway may have been a significant factor preventing the remnant breeding segments from recovering. The actual wintering areas were not known until the recovery of the first banded birds was reported in late 1974 in California. The wintering habitat has been the focus of study from 1974 to present. Areas in California and Oregon, essential to winter survival, have been identified and partially protected by inclusion of these lands in the National Wildlife Refuge System or California's Resource Agency Wildlife Area and State Park

systems. Additionally, major staging and migration areas, and additional wintering areas, including areas in California, have been closed to the hunting of this and/or other subspecies of Canada Goose, offering further protection.

Changing land use practices in California, including the conversion of cropland and pastures to housing and other urban development, adversely affect Aleutian geese (Service 1991). The lack of adequately protected migration and winter habitat for Aleutian geese is the greatest obstacle to full recovery of this species (Service 1991).

Bakersfield Cactus (*Opuntia basilaris* var. *treleasei*)

Species Description and Life History: The Bakersfield cactus was listed as endangered on July 19, 1990 (55 FR 29361). Bakersfield cactus is a perennial low growing cactus (Cactaceae) that typically spreads to form extensive thickets. It generally forms fleshy, flattened green beavertail-like pads (flattened stems) 3 to 4 inches wide by 5 to 7 inches long that produce showy magenta flowers. The eye-spots on the pads contain spines in addition to bristles. Soils supporting Bakersfield cactus typically are sandy, although gravel, cobbles or boulders also may be present. The species occurs on flood plains, ridges, bluffs and rolling hills in saltbush scrub plant communities, and occasionally in blue oak woodland or riparian woodland at elevations from 460 to 1800 feet.

The life span of wild plants has not been determined, but clumps in cultivation have survived for 48 years. The species' reproduction has not been studied. Vegetative reproduction is thought to be typical, as the plants produce seeds only infrequently. Pads may be dispersed by flood waters, but seed dispersal agents are unknown.

Historic and Current Distribution: The distribution of Bakersfield cactus is restricted to a limited area of central Kern County near Bakersfield. Once extensive colonies existed around Bakersfield, along the bluffs of the Kern River, along the Caliente Creek drainage and nearby foothills of the Tehachapi Mountains, and south to the Tejon Hills. Approximately one-third of the historical occurrences of Bakersfield cactus have been extirpated and the remaining populations are highly fragmented. Currently, Bakersfield cactus is known from the following general population areas in Kern County: a) Caliente Creek Drainage (Caliente - Bena Hills), b) Comanche Point, c) Cottonwood Creek, d) Fairfax Road - Highway 178 - Highway 184 - Kern Bluffs - Hart Part, e) Fuller Acres, f) Granite Station, g) mouth of Kern Canyon, h) Oildale - Kern River Oil Field - Round Mountain Road, I) Poso Creek, j) Sand Ridge, and k) Wheeler Ridge - Pleito Hills. The total population of Bakersfield cactus was not estimated historically. Densely-spaced clumps of cactus once covered and estimated area of 2 square miles from the Caliente Creek floodplain onto Sand Ridge. When known sites were last inventoried, fewer than 20,000 clumps of Bakersfield cactus were estimated to remain. Only four areas had populations of 1000 clumps or more: Comanche Point, Kern Bluff, Sand Ridge, and the area north of Wheeler Ridge (USFWS 1998).

Reasons for Decline and Threats to Survival: The most serious threats are residential development near Bakersfield and habitat conversion to agriculture. Other threats include periodic inundation of floodplain populations, pesticide drift, off-road vehicle use, sand and gravel mining, oil and gas exploration and development, and competition from nonnative annual grasses. Lack of genetic diversity and small population size increase the species' vulnerability to diseases, parasites, and chance events such as environmental fluctuations, catastrophes and genetic drift (USFWS 1998).

Bald Eagle (*Haliaeetus leucocephalus*)

Species Description and Life History: The bald eagle was listed as endangered in 1967 under the predecessor to the Endangered Species Act of 1973, as amended (Act). It was downlisted from endangered to threatened status on July 12, 1995 (60 FR 36010), and was proposed for delisting on July 6, 1999 (64 FR 36454). The bald eagle is a large raptor, a member of the family Accipitridae. The characteristic adult plumage consists of a white head and tail with a dark brown body. Juvenile eagles are completely dark brown and do not fully develop the white head and tail until the fifth or sixth year. Fish are the primary food source but bald eagles will also take a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available. Adults average about 3 feet from head to tail, weigh approximately 10 to 12 pounds and have a wingspread that can reach 7 feet. Generally, females are larger than the males.

Breeding pairs of bald eagles mate for life. The breeding season varies throughout the U.S., but typically begins in the winter for the southern populations and progressively shifts toward spring the further north the populations occur. The typical nest is constructed of large sticks and lined with soft materials such as pine needles and grasses. One to three eggs are laid in nests that are built in tall trees and measure up to 6 feet across and weighing hundreds of pounds. Nests are used by the same pair of eagles year after year, with alternate nests being built in the general area. The eggs are incubated about 35 days. The young fledge 9 to 14 weeks after hatching and at approximately 4 months the young eaglets are on their own.

Historic and Current Distribution: Bald eagles occur virtually anywhere in California during migration. They nest near water bodies in the northern portion of the state and winter throughout the state wherever suitable prey resources are available.

Reasons for Decline and Threats to Survival: After World War II, the use of DDT to control mosquitos became widespread along coastal and wetland areas. Bald eagles and many other birds of prey and piscivorous birds declined drastically. It was later determined that DDE, a breakdown product of DDT, was causing thin-shelled eggs, causing reproductive failure. The decline continued until DDT was banned from use in the United States on December 31, 1972. The number of breeding pairs in California has increased from 50 in 1981 to nearly 100 in the early 1990's. The current increases in populations throughout the range in the lower 48 states are due primarily to the banning of DDT and protection of nesting sites.

Blunt-nosed Leopard Lizard (*Gambelia sila*)

Species Description and Life History: The blunt-nosed leopard lizard was listed as endangered on March 11, 1967 (32 FR 4001). It was subsequently listed as endangered by the State of California in 1971. The species is included in the Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998).

The blunt-nosed leopard lizard is a relatively large lizard of the family Iguanidae and is endemic to the San Joaquin Valley, inhabiting open, sparsely vegetated areas of low relief on the Valley floor and the surrounding foothills. Blunt-nosed leopard lizards feed primarily on insects, lizards, and occasionally plant material.

Breeding activity begins within a month of emergence from dormancy and lasts from the end of April to the end of June. Males are highly combative in establishing and maintaining territories. Male and female home ranges often overlap. The mean home range size varies from 0.25 to 2.7 acres for females and 0.52 to 4.2 acres for males. Two to six eggs are laid in June and July, and their numbers are correlated with the size of the female. Under adverse conditions, egg-laying may be delayed 1 or 2 months or reproduction may not occur at all. Females typically produce only one clutch of eggs per year, but some may produce three or more under favorable environmental conditions. After about 2 months of incubation, young hatch from late July through early August, rarely to September.

Leopard lizards use small rodent burrows for shelter from predators and temperature extremes. Burrows are usually abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels. Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. In areas of low mammal burrow density, lizards will construct shallow, simple tunnels in earth berms or under rocks. Potential predators are numerous and include snakes, predatory birds, and most carnivorous valley mammals.

Lizards are active on the surface when air temperatures are between 73 and 104°F and surface soil temperatures are 71 and 122°F. Optimal activity occurs when ground temperatures are between 71 and 97°F or slightly higher. Smaller lizards and young have a wider activity range than the adults.

Historic and Current Distribution: Although the boundaries of its original distribution are uncertain, blunt-nosed leopard lizards probably occurred in the San Joaquin Valley from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south, and from the Coast Range mountains, Carrizo Plain and Cuyama Valley in the west to the foothills of the Sierra Nevada in the east. In general, leopard lizards are absent from areas of steep slope, dense vegetation, or areas subject to seasonal flooding.

The currently occupied range consists of scattered parcels of undeveloped land on the Valley floor, most commonly annual grassland and valley sink scrub. The lizards also inhabit alkali

playa and valley saltbush scrub. In the southern San Joaquin Valley, extant populations are known to occur on the Kern and Pixley National Wildlife Refuges, Liberty Farms, Allensworth, Antelope, the Carrizo and Elkhorn plains, the Buttonwillow, Elk Hills and Tupman Essential Habitat Areas, north of Bakersfield around Poso Creek, and in western Kern County around the towns of Maricopa, McKittrick and Taft.

Reasons for Decline and Threats to Survival: The primary cause of population decline for the blunt-nosed leopard lizard is the conversion of habitat to agriculture. Since the 1870's, more than 95 percent of the lizard's natural habitat have been destroyed. Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization. Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. However, light or moderate grazing may be beneficial.

Pesticides, rodenticides, and other chemical may directed and indirectly impact leopard lizards. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned.

Buena Vista Lake Shrew (*Sorex ornatus relictus*)

Species Description and Life History: The Buena Vista Lake Shrew was proposed for listing on June 1, 2000 (65 FR 35033). It is a small mammals that grows to 1 inch, weighing 0.14-0.27 ounces. It is blackish brown above, shading to buffy brown then to smoke grey on the ventral side. Little is known about the reproduction or demography of the shrew. It lives in dense vegetation around the perimeter of marshes, lakes or sloughs.

Historic and Current Distribution: The Buena Vista Lake shrew formerly occupied the marshlands of the Buena Vista Lake and the Tulare Basin. Its range has become much restricted due to the loss of lakes and sloughs in the area. The population around Buena Vista Lake, where the type specimen was collected, is most likely extinct. Individuals have recently been recorded from the Kern Lake Preserve area and the Kern National Wildlife Refuge. Current distribution is unknown but likely to be very restricted due to the loss of habitat.

Reasons for Decline and Threats to Survival: Loss and fragmentation of habitat seem to be the main causes of decline of the Buena Vista Lake shrew. Conversion of historical range to agricultural land has sharply reduced the available habitat. The Kern Lake Preserve was formerly managed by the Nature Conservancy, but has now reverted to private management. What little habitat is left around the Kern Lake Preserve area should be protected for this species.

California Condor (*Gymnogyps californianus*)

Species Description and Life History: The California Condor was listed as endangered on August 11, 1997 (32 FR 4001). Critical habitat has been designated in Tulare, Kern, Los Angeles,

Ventura, Santa Barbara, and San Luis Obispo Counties (USFWS 1996). California Condors are members of the New World vulture family (Cathartidae) and are among the largest flying birds. Adults weigh approximately 20 pounds and have a wing span up to 10 feet. They are black except for white underwing linings and edges of the upper secondary coverts. The head and neck are mostly naked; the skin on the neck area is gray, grading into various shades of yellow, red and orange on the head. Males and females cannot be distinguished by size or plumage characteristics.

Historic and Current Distribution: As of 1986, the California condor population declined to five individuals in the wild as a result of human persecution, pesticides, lead poisoning and habitat loss. In 1987, all remaining birds in the wild were captured and placed in a captive breeding program. In 1992, condors began to be reintroduced into the wild. As of July 2000, there were 171 California Condors in the world -- 48 in the wild in California and Nevada and 123 in captive-breeding facilities.

Wild populations of condors nest and roost along foothills and mountains surrounding the southern San Joaquin Valley, including Santa Barbara, San Luis Obispo, Los Angeles, eastern Tulare, Ventura and Kern Counties. Nesting habitat is found in the mountains of northern Los Angeles and Ventura Counties, central Santa Barbara County and eastern Tulare County. They principally forage in the foothills of the above counties, but may forage on the valley floor as animals bred in captivity tend to be more opportunistic feeders (Robert Mesta personal communication 1998). Typically, foraging sites are in grasslands or oak-savannah regions at lower elevations than most roosting and nesting sites. The important foraging areas are primarily private grazing lands.

Reasons for Decline and Threats to Survival: The decline of the California condor population is attributed to human persecution, pesticide use, lead poisoning, and habitat loss. Threats to the current population include collisions with man-made structures, particularly power lines, lead poisoning from ingesting carcasses shot with lead bullets, and direct ingestion of toxic chemicals. Most deaths of the reintroduced condors are associated with power lines and lead poisoning. The small number of individuals remaining in the wild also pose a threat to the future recovery of this species.

California Jewelflower (*Caulanthus californicus*)

Species Description and Life History: The California jewelflower was listed as an endangered species on July 19, 1990 (55 FR 29361). It is an annual herb belonging to the mustard family (Brassicaceae), and has flattened, sword-shaped fruits. Known populations of California jewelflower occur in non-native grassland, upper sonoran subshrub scrub, and cismontane juniper woodland and scrub communities. Historical records suggest that it also occurred in the valley saltbush scrub community in the past. Populations of California jewelflower have been reported from subalkaline, sandy loam soils at elevations of approximately 240 to 2,950 feet.

Seeds of California jewelflower begin to germinate in the fall, and seedlings may continue to emerge for several months. The seedlings develop into rosettes of leaves during the winter months, after which stems elongate and flower buds appear in February or March. Flowering and seed set may continue as late as May in years of favorable rainfall and temperatures. It is thought that California jewelflower forms a persistent seed bank, but seeds appear to germinate only when exposed to conditions simulating prolonged weathering. Seed dispersal agents are unknown, but may include gravity, seed-eating animals such as giant kangaroo rats, wind, and water.

Pollinator-exclusion experiments indicated that insects are necessary for seed set in California jewelflower. Honeybees (*Apis mellifera*) have been observed visiting the flowers, but native insects also would be expected to serve as pollinators. Closely related species of the genus *Thelypodium* were visited by several species of bees (*Bombus* sp., *Apis* sp., and *Xylocopa* sp.) and butterflies (*Pieris* sp.).

Historic and Current Distribution: The historical distribution of California jewelflower is known from 40 herbarium specimens, which were collected in 7 counties between 1880 and 1973. Approximately half of the collection sites were on the floor of the San Joaquin Valley in Fresno, Kern, and Tulare Counties. Several other collections came from two smaller valleys southwest of the San Joaquin Valley: the Carrizo Plain (San Luis Obispo County) and the Cuyama Valley (Santa Barbara and Ventura Counties). Three occurrences (i.e., collection sites separated by 0.4 kilometer [0.25 mile] or more) were in the Sierra Nevada foothills at the eastern margin of the San Joaquin Valley in Kern County. The remainder of the historical sites were in foothills west of the San Joaquin Valley, in Fresno, Kern, and Kings Counties (Service 1997). By 1986, all the occurrences on the San Joaquin and Cuyama Valley floors had been eliminated, and the only natural population known to be extant (i.e., still in existence) was in Santa Barbara Canyon, which is adjacent to the Cuyama Valley in Santa Barbara County (Taylor and Davilla in litt. 1986). A small, introduced colony also existed at the Paine Preserve in Kern County at that time. Since then, several more introductions have been attempted (see Conservation Efforts), and a number of colonies were rediscovered in two other areas where the species had been collected historically. The naturally-occurring populations known to exist today are distributed in three centers of concentration: (1) Santa Barbara Canyon, (2) the Carrizo Plain, and (3) the Kreyenhagen Hills in Fresno County. The Santa Barbara Canyon metapopulation occurs on the terraces just west of the Cuyama River and includes approximately 30 acres of occupied habitat. The Carrizo Plain metapopulation is confined to the western side of the Carrizo Plain and encompasses approximately 10 acres of occupied habitat. The Kreyenhagen Hills metapopulation includes 4 small colonies within a small area of rolling hills.

Reasons for Decline and Threats to Survival: The primary reason for decline of California jewelflower was habitat conversion to agriculture and urban development. Potential threats to one or more of the remaining populations of California jewelflower include development on private land in the Santa Barbara Canyon area, competition from non-native plants, direct and indirect effects from pesticide and herbicide use for insect control and cropland management, and

potential cattle grazing of populations on private lands. The small population size of the California jewelflower also makes it vulnerable to natural catastrophic events such as drought or fire.

California Red-legged Frog (*Rana aurora draytonii*)

Species Description and Life History: The California red-legged frog was listed as threatened on May 23, 1996. Critical habitat was proposed for the species on September 11, 2000 (65 FR 1018), and a draft Recovery Plan was issued in 2000 (USFWS 2000). The California red-legged frog is the largest native frog in the western United States, ranging from 1.5 to 5 inches in length. The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers. Dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3 inches in length, and the background color of the body is dark brown and yellow with darker spots.

Historical and Current Distribution: The California red-legged frog is now found primarily in wetlands and streams in coastal drainages of central California, and in the Sierra Nevada foothills. Red-legged frogs are known to occur in about 240 streams or drainages from 24 counties, primarily in central coastal California, and the foothill regions of the western Sierra Nevada. Only three areas within the entire historic range of the subspecies may currently support more than 350 adults.

Reasons for Decline and Threats to Survival: The California red-legged frog has sustained a 75 percent reduction in its geographic range in California as a result of several factors acting singly or in combination. Habitat loss and alteration, combined with over exploitation and introduction of exotic predators, were significant factors in the red-legged frogs' decline in the early to mid-1900s.

The California red-legged frog is threatened within its remaining range by a wide variety of human impacts, including urban encroachment, construction of reservoirs and water diversions, land conversions, industrial and non-industrial forest practices, introduction of exotic predators and competitors, livestock grazing, and habitat fragmentation. It is estimated that California red-legged frogs were extirpated from the Central Valley floor before 1960.

Remaining aggregations (assemblages of one or more individuals, not necessarily a viable population) of California red-legged frogs in the Sierran foothills became fragmented and have been nearly extirpated by reservoir construction, continued expansion of exotic predators, grazing, and prolonged drought. Within the Central Valley hydrographic basin, only 14 drainages on the Coast Ranges slope of the San Joaquin Valley and three drainages in the Sierran foothills are actually known to support or may support California red-legged frogs, compared to over 60 historic locality records for these basins.

California red-legged frog population numbers are not precisely known, although the Service estimates that California red-legged frog populations are declining throughout the range of the subspecies. There is not a recent scientific estimate on the rate of the decline, but many of the remaining populations appear to be declining at a rapid rate. Only three populations were thought to have more than 350 adult frogs when the species was proposed in 1994. Of those three populations, only one is thought to remain intact, one has declined to such an extent that detections are unlikely, and the third is thought to be in decline.

California Tiger Salamander (*Ambystoma californiense*)

Species Description and Life History: The California tiger salamander is a candidate species for Federal listing as threatened; the population in Santa Barbara is already listed as endangered. The California tiger salamander is restricted to grasslands and low (under 1500 foot) foothill regions where lowland aquatic sites are available for breeding. The larvae require significantly more time to transform into juvenile adults than other amphibians such as the western spadefoot toad (*Scaphiopus hammondi*) and Pacific tree frog (*Pseudacris regilla*), and prefer natural ephemeral pools, or ponds that mimic ephemeral pools (stock ponds that go dry). These requirements restrict California tiger salamanders to large vernal pools, vernal playas and large sag ponds. Compared to the western toad (*Bufo boreas*) or western spadefoot toad, California tiger salamanders are poor burrowers, and so require refugia provided by ground squirrels and other burrowing mammals in which to estivate during the dry months.

A typical salamander breeding population in a pond can fluctuate through stochastic processes to less than twenty individual breeding adults and/or recruiting juveniles in some years, making these local populations prone to extinction. California tiger salamanders therefore require large contiguous areas of vernal pools (vernal pool complexes or comparable aquatic breeding habitat) containing multiple breeding ponds to ensure that recolonization occurs at individual pond sites.

Current and Historic Distribution: The range of California tiger salamander is restricted to California. The species persists in disjunct remnant vernal pool complexes in Sonoma and Santa Barbara counties, in vernal pool complexes and isolated ponds scattered along a narrow strip of rangeland on the fringes of the Central Valley from southern Colusa County south to northern Kern County, and in sag ponds and human-maintained stock ponds in the coast ranges from the San Francisco Bay area south to the Temblor Range. The California tiger salamander has been eliminated from an estimated 55 to 58 percent of its historic breeding sites and has lost an estimated 75 percent of its habitat. California tiger salamanders are presently protected only at Jepson Prairie Natural Preserve and Hickson Preserve. There are approximately 150 known local populations of California tiger salamanders.

Reason for Decline and Threats to Survival: The primary cause of the decline of California tiger salamander populations is the loss and fragmentation of habitat from human activities and the encroachment of nonnative predators. Federal, State and local laws have not prevented past and ongoing losses of California tiger salamander habitat. All of the estimated seven genetic

populations of this species have been significantly reduced because of urban and agricultural development, land conversion, and other human-caused factors.

A strong negative association between bullfrogs and California tiger salamanders has been documented. Although bullfrogs are unable to establish permanent breeding populations in vernal pools, dispersing immature frogs from permanent water bodies within two miles take up residence and prey on adult or larval salamanders in these areas during the rainy season. Louisiana swamp crayfish, mosquito fish, green sunfish and other introduced fishes also prey on adult or larval salamanders. A deformity-causing infection, possibly caused by a parasite in the presence of other factors, has affected pond-breeding amphibians in California at known California tiger salamander breeding sites. This infection has become widespread among amphibian populations in Minnesota and poses a threat of becoming widespread in California. Tiger salamanders have been known to be locally extirpated from disease at stock tanks in Arizona.

Reduction of ground squirrel populations to low levels through widespread rodent control programs may reduce availability of burrows and adversely affect the California tiger salamander. Poison typically used on ground squirrels is likely to have a disproportionately adverse effect on California tiger salamanders, which are smaller and have permeable skins. Use of pesticides, such as methoprene, in mosquito abatement may have an indirect adverse effect on the California tiger salamander by reducing the availability of prey. Various nonnative subspecies of the tiger salamander within the *Ambystoma tigrinum* complex have been imported into California for use as fish bait. The introduced salamanders may out-compete the California tiger salamanders, or interbreed with the natives to create hybrids that may be less adapted to the California climate or are not reproductively viable past the first or second generations. Automobiles and off-road vehicles kill a significant number of migrating California tiger salamanders, and contaminated runoff from roads, highways, and agriculture may adversely affect the California tiger salamander.

Approximately 5 percent of remaining populations occur on government-owned lands; the rest are on private lands. The two remaining strongholds for the species include: (1) Alameda and Contra Costa counties, where the cities of Brentwood, Livermore, Dublin, Pleasanton, and housing developments in unincorporated portions of those counties, are rapidly expanding, and where the Los Vaqueros Reservoir project is under construction; and (2) portions of Madera and Fresno Counties west and south of Millerton Lake where the Rio Mesa area plan (which covers approximately 15,000 acres in southeast Madera County) and several large developments in the vicinity of Friant are planned. These developments threaten to permanently reduce the amount of grassland and ground squirrel habitat available to California tiger salamanders, and to destroy the natural ephemeral bodies of water they require.

Colusa Grass (*Neostapfia colusana*)

Species Description and Life History: Colusa grass was listed as threatened on March 26, 1997 (62 FR 14338). It is a robust, tufted annual in the grass family (Poaceae) that grows 3-12 inches tall. The lower portions of the stems lie on the ground; the upper portions are erect and terminate in dense cylindrical, spike-like inflorescences that superficially resemble small ears of corn. The inflorescence and overall appearance of the plant are unique, so this species is not easily confused with any other. Its closest relatives are the Orcutt grasses. Colusa grass is the only extant species in the genus *Neostapfia*. Colusa grass occurs in large or deep vernal pools with substrates of adobe mud (Stone *et al.* 1988).

Historic and Current Distribution: Colusa grass is restricted to the Sacramento and San Joaquin Valleys. Converting habitat to agricultural use has eliminated the type locality in Colusa County and at least 7 populations have been eliminated in Merced and Stanislaus Counties. Approximately 44 populations remain along a 100-mile stretch of the eastern San Joaquin Valley in Merced and Stanislaus Counties; 4 populations exist in Yolo and Solano Counties. All populations exist on private lands, with the exception of one found on Castle Air Force Base in Merced County and one on McClellan Air Force Base in Yolo County.

Reasons for Decline and Threats to Survival: Most of the remaining populations continue to be variously threatened by agricultural land conversion, herbicide contaminated runoff, and competition from introduced weedy species that tend to displace Colusa grass. Two populations are currently protected at the Nature Conservancy's Jepson Prairie Preserve in Solano County and at the Flying M Ranch in Merced County, where conservation easements protect some of the large vernal pools.

Conservancy Fairy Shrimp (*Branchinecta conservatio*)

Species Description and Life History: The Conservancy fairy shrimp was listed as endangered on September 19, 1994 (59 FR 48136). It is an aquatic crustacean belong to the order Anostraca. It has delicate elongate bodies, large stalked compound eyes, no carapaces, and 11 pairs of swimming legs. It glides gracefully upside down, swimming by beating their legs in a complex, wavelike movement that passes from front to back. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The resting or "summer" eggs are known as "cysts." They are capable of withstanding heat, cold and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. The cysts hatch when the pools fill with rainwater. The early stages of the fairy shrimp develop rapidly into adults. These non-dormant populations often disappear early in the season long before the vernal pools dry up.

Conservancy fairy shrimp inhabit vernal pools that are large with highly turbid water. They have been collected from early November to early April.

Historic and Current Distribution: The Conservancy fairy shrimp is known from six disjunct populations: Vina Plains, north of Chico, Tehama County; south of Chico, Butte County; Jepson Prairie, Solano County; Sacramento National Wildlife Refuge, Glenn County; near Haystack Mountain northeast of Merced in Merced County; and the Lockwood Valley of northern Ventura County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to primarily agricultural and urban uses. This highly disturbed remnant habitat is not protected and the existing populations of the vernal pool fairy shrimp and vernal pool tadpole shrimp are imperiled by a variety of human-caused activities, primarily urban development, water supply/flood control projects and conversion of land to agricultural use.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, the endemic habitat of the vernal pool fairy shrimp, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

The habitat of the listed vernal pool crustaceans is highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. This fragmentation results in small isolated fairy shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987a,b). Should extinction occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to geographical isolation from other populations.

Delta Smelt (*Hypomesus transpacificus*)

Species Description and Life History: The delta smelt was listed as threatened on March 5, 1993 (58 FR 12863). Critical habitat is designated as areas of all water and all submerged lands below ordinary high water and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the existing contiguous waters contained within the Delta, as defined in Section 12220 of the California Water Code (50 CFR Section 17.95). The delta smelt is included in the Recovery Plan for Sacramento/San Joaquin Delta Native Fishes (USFWS 1996).

Delta smelt are a slender-bodied fish with a steely blue sheen on the sides and seem almost translucent. The delta smelt, which has a lifespan of one year, has an average length of about 2 to 3 inches.

The delta smelt is an euryhaline species (tolerant of a wide salinity range) that spawns in fresh water and has been collected from estuarine waters up to 14 ppt (parts per thousand) salinity. For a large part of its annual life span, this species is associated with the freshwater edge of the mixing zone (saltwater-freshwater interface), where the salinity is approximately 2 ppt.

Shortly before spawning, adult delta smelt migrate upstream from the brackish-water habitat associated with the mixing zone to disperse widely into river channels and tidally-influenced backwater sloughs. Delta smelt spawn in shallow, fresh, or slightly brackish water upstream of the mixing zone. Most spawning occurs in tidally-influenced backwater sloughs and channel edgewaters. Although delta smelt spawning behavior has not been observed in the wild, the adhesive, demersal eggs are thought to attach to substrates such as cattails, tules, tree roots, and submerged branches.

Historic and Current Distribution: Delta smelt are endemic to the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties, California. The delta smelt is thought to have occurred historically from Suisun Bay upstream to at least the city of Sacramento on the Sacramento River and Mossdale on the San Joaquin River.

Delta smelt were once one of the most common pelagic (living in open water away from the bottom) fish in the upper Sacramento-San Joaquin estuary, as indicated by its abundance in CDFG trawl catches. The actual size of the delta smelt population is not known. Stevens *et al.* estimated the population size to be about 280,000, but they recognized that this value is based on a tenuous relationship between delta smelt numbers and numbers of young striped bass, and is imperfect. However, the pelagic life style of delta smelt, short life span, spawning habits, and relatively low fecundity indicate that a fairly substantial population probably is necessary to keep the species from becoming extinct.

Reasons for Decline and Threats to Survival: The cause of decline of delta smelt are numerous, and include diversion of water from the Sacramento and San Joaquin Rivers for agricultural and development purposes, entrapment of young fish in water diversion systems, decrease in native copepod prey numbers, pesticide and other chemical effects, and potential hybridization with introduced Japanese pond smelt. Because delta smelt are a one-year species, the impacts of the above anthropogenic factors are magnified. These factors continue to threaten the survival and recovery of the species.

Fleshy Owl's-Clover (*Castilleja campestris* ssp. *succulenta*)

Species Description and Life History: The fleshy owl's-clover was listed as threatened on March 26, 1997 (62 FR 14338). Fleshy owl's-clover is an annual herb in the snapdragon family (Scrophulariaceae). Its stems are erect, generally 2-10 inches tall, and may be branched or

unbranched. The leaves are succulent and brittle. Bright yellow to white flowers appear in May, clustered near the ends of branches and surrounded by leafy bracts. Like other members of *Castilleja* and related genera, it is hemiparasitic (partly parasitic) on the roots of other plants. It occurs on the margins of vernal pools, swales and some seasonal wetlands, often on acidic soils. It is never dominant and it is found in only a few of the pools in an area (Skinner and Pavlik 1994). The species' range overlaps that of the related *Castilleja campestris* ssp. *campestris* in Stanislaus County, but the latter can be distinguished by its usually more brittle leaves, shorter bracts, larger corollas and longer stigma.

Historical and Current Distribution: Fleshy owl's-clover is endemic to the rolling lower foothills and valleys along a 66-mile stretch of the eastern San Joaquin Valley. Its historical range was presumably somewhat greater than its current range. It is currently known from 36 sites in eastern Merced, southeastern Stanislaus, Madera, San Joaquin and northern Fresno Counties.

Reasons for Decline and Threats to Survival: Nearly one-half of the currently known populations of fleshy owl's-clover are variously threatened by loss and degradation of habitat resulting from urban development, agricultural land conversion, discing, flood control projects, overgrazing and a highway expansion project. Twenty-two populations occur on private lands without protection for the species. Discing appears to have eliminated at least one population in Fresno County. Seven populations are protected at the Flying M Ranch in Merced County, where The Nature Conservancy (TNC) has a conservation easement. Two other populations occur on lands managed by the U.S. Bureau of Reclamation and the U.S. Bureau of Land Management.

Fresno Kangaroo Rat (*Dipodomys nitratoide exilis*)

Species Description and Life History: The Fresno kangaroo rat was listed as endangered in 1985 (50 FR 4226). 857 acres of critical habitat has been designated in Fresno County (50 CFR 17.95a). Twenty-three acres are in a small part of the Mendota Wildlife Management Area, 732 acres comprise the contiguous Alkali Sink Ecological Reserve, both State-owned and managed, and 102 acres are in five privately-owned parcels. Recovery of the Fresno kangaroo rat is discussed in the Upland Recovery Plan (USFWS 1998).

The Fresno kangaroo rat is one of three subspecies of San Joaquin kangaroo rats. Although there is a slight size difference among the subspecies, with the Fresno being the smallest, the subspecies cannot be distinguished reliably except through genetic analysis. Like the other 20 species of kangaroo rats, the San Joaquin kangaroo rat have physiological adaptations to bipedal hopping that include elongated hind limbs, a long, tufted tail for balance, a shortened neck and a large, flattened head. Other characteristics include large, dorsally placed eyes and small, rounded ears. Fore-limbs are comparatively short with stout claws that facilitate digging burrows. The fur is dark yellowish-buff dorsally and white ventrally. A white stripe extends across the hips, continuing for the length of the tufted tail. The base of the tail is circumscribed by white. Dorsal and ventral sides of the tail are blackish. Dark whisker patches on each side of the nose are connected by a black band of fur. San Joaquin kangaroo rats can be distinguished from other

kangaroo rats within their range by the presence of four toes on the hind foot; other species have five toes.

Fresno kangaroo rats eat mostly seeds, with small amounts of green, herbaceous vegetation and insects supplementing their diet when available. Most kangaroo rats gather seeds when they are available and cache them for consumption later. Typically, caches are made in small pits that hold the contents of the two cheek pouches. Caches are located on the surface of the soil, and are typically scattered over the home range of the individual. Fresno kangaroo rats may not cache seeds in their burrows to the same extent as other kangaroo rats. The soil where they live is damp much of the year, and seeds would spoil rapidly under such conditions. Therefore, Fresno kangaroo rats may be obligated to forage on the surface year round.

Historic and Current Distribution: The historic range of the Fresno kangaroo rat encompassed an area of grassland and chenopod scrub communities on the San Joaquin Valley floor, from about the Merced River, Merced County, on the north, to the northern edge of the marshes surrounding Tulare Lake, Kings County, on the south, and extending from the edge of the Valley floor near Livingston, Madera, Fresno, and Selma, westward to the wetlands of Fresno Slough and the San Joaquin River. Documentation of historical distribution is scanty. An estimate of the historical range, within the area as outlined above, is about 888,459 acres. As Fresno kangaroo rats prefer nearly level, light friable soils, not all of this area would have been habitat.

There are no known populations within the circumscribed historical geographic range in Merced, Madera, and Fresno Counties. In Kings County, two populations of San Joaquin kangaroo rats have been found on about 371 acres in 1994 and 1995. One site, Lemoore Naval Air Station, is 97 acres. Whether these populations belong to the Fresno or Tipton subspecies is uncertain, but historically, their ranges were contiguous. Genetic research is ongoing to identify these populations to subspecies.

Reasons for Decline and Threats to Survival: Loss of habitat to cultivation, year-round grazing and conversion of land to other uses, coupled with the resulting fragmentation and isolation of populations increase the probability of extinction from demographic and genetic stochasticity. Flooding due to levee failure also poses a high risk because of the proximity to the San Joaquin River. Other potential threats are the indiscriminate use of rodenticides, competition with Heermann's kangaroo rats, and disease and predation, any of which could extirpate small, isolated populations.

Giant Garter Snake (*Thamnophis gigas*)

Species Description and Life History: The giant garter snake was listed as threatened on October 20, 1993 (58 FR 54053). No critical habitat has been designated. A draft recovery plan for the giant garter snake was released in 1999 (USFWS 1999).

The giant garter snake is one of the largest garter snakes, reaching a total length of at least 63 inches. Females tend to be slightly longer and proportionately heavier than males. Female giant

garter snakes typically weigh 1-1.5 pounds. Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light colored lateral stripes. Background coloration and prominence of a black checkered pattern and the three light stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Giant garter snakes feed primarily on small fishes, tadpoles, and frogs. Habitat requisites consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.

The giant garter snake inhabits small mammal burrows and other soil crevices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). Giant garter snakes typically select burrows with sunny exposure along south and west facing slopes. The breeding season extends through March and April, and females give birth to live young from late July through early September. Brood size is variable, ranging from 10 to 46 young, with a mean of 23. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size within the first year. Sexual maturity averages three years for males and five years for females.

Historic and Current Distribution: Although the boundaries of its original distribution is uncertain, Fitch (1941) described the historical range of the giant garter snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. The Service currently recognize 13 separate distinct populations of the giant garter snake: (1) Butte Basin, (2) Colusa Vasin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/ Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh, (10) East Stockton- Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare.

Reasons for Decline and Threats to Survival: Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range. The survival of giant garter snake populations are currently threatened by selenium contamination, introduction of predatory game fish and bullfrogs, loss and alteration of habitat associated with agriculture and urban development, and road kills. The isolation of the 13 extant populations from each other without protected dispersal corridors make the species vulnerable to extirpation by random, naturally occurring environmental events, population dynamics and genetic processes.

Giant Kangaroo Rat (*Dipodomys ingens*)

Species Description and Life History: The giant kangaroo rat was listed as endangered on January 5, 1987 (52 FR 288). No critical habitat has been designated. The giant kangaroo rat is included in the Upland Species Recovery Plan (USFWS 1998).

The giant kangaroo rat is the largest of more than 20 species in the genus (4.6 to 6.4 ounces in weight, 12.2 to 13.7 inches in length), and is adapted for two-footed or bipedal hopping. The hind limbs are large compared to the size of the forelimbs; the neck is short; and the head is large and flattened. The tail is longer than the combined head and body length and has a dorsal crest of long hairs distally, terminating in a large tuft. Large, fur-lined cheek pouches open on each side of the mouth. The pouches extend as deep invaginated pockets of skin along the sides of the head. The giant kangaroo rats are distinguished from the coexisting species San Joaquin kangaroo rat (*D. nitratoides*) and Heermann's kangaroo rat (*D. heermanni*), by size and number of toes on the hind foot. The hind feet of adult giant kangaroo rats each have five toes.

Preferred habitat of giant kangaroo rats is annual grassland on gentle slopes of generally less than 10," with friable, sandy-loam soils. However, most remaining populations are on poorer and marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22." Giant kangaroo rats are primarily seed eaters, caching ripening seed heads in small surface pits or large stacks on the surface over their burrow system. After curing for several weeks, seeds are transported to underground larders. Giant kangaroo rats forage on the surface from around sunset to near sunrise, with most activity taking place in the first two hours after dark. Foraging activity is greatest in the spring as seeds of annual plants ripen. Giant kangaroo rats develop burrow systems with one to five or more separate openings, of two types: a vertical shaft with a circular opening and no dirt apron; and a larger, more horizontally-opening shaft, usually wider than high with a well-worn path leading from the mouth.

Historic and Current Distribution: The historical distribution of giant kangaroo rats encompassed a narrow band of gently sloping ground along the western edge of the San Joaquin Valley, with occasional colonies on steeper slopes and ridge tops, from the base of the Tehachapi Mountains, Kern County, in the south, to near Los Banos, Merced County, in the north. Historical habitat was estimated to have included over one and a half million acres. The species population is currently fragmented into six major geographic units. The units located in the southern San Joaquin Valley are: the Kettleman Hills in Kings County; and western Kern County in the area of the Lokern, Elk Hills, and other uplands around McKittrick, Taft, and Maricopa. The major units are fragmented into more than 100 smaller populations, many of which are isolated by several miles of barriers such as steep terrain with plant communities unsuitable as habitat, or agricultural, industrial, or urban land without habitat for this species. Extant habitat is estimated to be 27,540 acres, about 2 percent of historical habitat.

Within the area of currently occupied habitat, populations of giant kangaroo rats studied since 1979 have expanded and declined 6 to 10-fold with changing weather patterns. Density estimates range from 2.5 to 275 animals per acre. Changes in density generally coincide with

amount of rainfall and herbaceous plant productivity, however, the seed caching behavior of these rats may offset this effect.

Reasons for Decline and Threats to Survival: Completion of Federal and State water projects resulted in rapid cultivation and irrigation of giant kangaroo rat habitat. Urban and industrial developments, petroleum and mineral exploration and extraction, new energy and water conveyance facilities, and construction of communication and transportation infrastructures continue to destroy habitat for giant kangaroo rats and increase the threats to the species by reducing and further fragmenting populations. Use of rodenticide-treated grain to control ground squirrels and kangaroo rats also may have contributed to the decline of giant kangaroo rats. The potential sale of the Naval Petroleum Reserves in California to private interests represents a threat to one of the three largest regional populations of giant kangaroo rats.

Greene's Tuctoria (*Tuctoria greenei*)

Species Description and Life History: Greene's tuctoria is a small, tufted annual in the grass family (Poaceae). The plant has several to many stems 2-6 inches tall, each ending in a spike-like inflorescence that may be partly enfolded in the upper leaf. The genus *Tuctoria* is distinguished from other Orcutt grasses (in the genus *Orcuttia*) by the spiral arrangement of the spikelets (flowers) and other characteristics of its flower parts (Stone *et al.* 1988; 58 FR 14338). Greene's tuctoria occurs in small or shallow vernal pools or the early drying sections of large, deep vernal pools (Stone *et al.* 1988).

Historic and Current Distribution: Greene's tuctoria is restricted to vernal pools in the Central Valley. Its historical range included parts of Shasta, Tehama and Butte Counties in the northern Sacramento Valley, and extended from San Joaquin County to Tulare County in the San Joaquin Valley. The taxon no longer occurs in Fresno, Madera and Tulare Counties. The 19 remaining populations are in Shasta, southern Tehama, Butte, Glenn, and eastern Merced Counties (CDFG 1992; 58 FR 14338).

Reasons for Decline and Threats to Survival: At least nine historic populations of Greene's tuctoria have been eliminated by conversion of habitat to irrigated agriculture. Six historic populations are known or presumed to have been eliminated by overgrazing, and at least one population has been eliminated by urbanization. Agriculture, overgrazing and urban development continue to threaten most of the 19 remaining populations (CDFG 1992; 58 FR 14338), all of which are on private land. Four populations occur in The Nature Conservancy's Vina Plains Preserve, but three of these are grazed by cattle (CDFG 1992; 58 FR 14338).

Hairy Orcutt Grass (*Orcuttia pilosa*)

Species Description and Life History: The hairy Orcutt grass was listed as endangered on March 26, 1997 (62 FR 14338). This species was listed as endangered by the California Department of Fish and Game in 1979, and the California Native Plant Society has placed it on List 1B (rare or endangered throughout its range). Hairy Orcutt grass is a small, tufted annual in the grass family

(Poaceae). The plant has several stems 2-8 inches tall, each stem ending in a long, spike-like inflorescence. Spikelets are strongly congested at the upper end of the inflorescence. The equal-length lemmas are deeply cleft into fine teeth that are sharp-pointed or short-awned. Foliage is grayish, with soft, straight hairs.

Historic and Current Distribution: Hairy Orcutt grass inhabits vernal pools in rolling topography on remnant alluvial fans and stream terraces. The historical range includes the eastern margins of Sacramento and San Joaquin Valleys from Tehama County south to Stanislaus County and through Merced and Madera counties. Only 24 of 34 historically known populations exist. More than one third of the remaining populations occur in Tehama County. Others are in Butte, Glenn, Madera and Stanislaus Counties. The species has been extirpated from Merced County.

Reasons for Decline and Threats to Survival: Conversion of vernal pool habitat to irrigated agriculture or to urban uses has been the primary factor leading to decline in this species. Of the 24 native, extant populations and 1 translocated population, only 12 populations are considered stable (Stone *et al.* 1988). Urbanization, agricultural land conversion, a highway expansion projects, discing, off-highway vehicle use, and competition from nonnative weeds continue to threaten most of the remaining populations.

Populations at the Nature Conservancy's Vina Plains Preserve are partially protected from disturbance. They were monitored during a baseline survey and weeded to reduce competition with nonnative species (Stone *et al.* 1988). Hairy Orcutt grass is found on Federal lands at the following locations: three populations occur on the Sacramento National Wildlife Refuge in Tehama County and one population occurs on Bureau of Reclamation land in Fresno County. The translocated population of hairy Orcutt grass is found on land owned by the California State Department of Transportation. The remaining 21 populations occur on private lands.

Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)

Species Description and Life History: Hartweg's golden sunburst (also called Hartweg's pseudobahia) was listed as endangered on February 6, 1977 (62 FR 5542). It is a slender, woolly annual in the sunflower family (Asteraceae). It has one or a few stems 2-6 inches tall, with mostly narrow, undivided leaves, and yellow ray flowers. A member of the sneezeweed tribe (Helenieae), *Pseudobahia* is distinguished from related genera by characteristics of the leaves, flowers, and seeds. Hartweg's golden sunburst is distinguished from other members of the genus by the shape of its largest leaves, which are entire or three-lobed.

Hartweg's golden sunburst occurs in open grasslands and grasslands at the margins of blue oak woodland, primarily on shallow, well-drained, fine-textured soils of the Amador and Rocklin series. Both soil types exhibit strong Mima mound microrelief characterized by mounds roughly 1-6 feet high and 10-100 feet in diameter at the base, interspersed with basins that may pond water in the rainy season. Hartweg's golden sunburst nearly always occurs on the north- or northeast-facing slopes of such mounds, with the highest plant densities on upper slopes with minimal grass cover.

Historic and Current Distribution: Hartweg's golden sunburst is endemic to the Central Valley. Historically, it may have extended from Yuba County south to Fresno County, a range of 200 miles. Within this range, the species was only locally abundant. Today, it is limited to 16 populations on the eastern edge of the San Joaquin Valley. Remaining populations are concentrated in the Friant region of Fresno and Madera Counties and the La Grange region in Stanislaus County (California Dept. of Fish and Game 1992).

Reasons for Decline and Threats to Survival: Hartweg's golden sunburst has declined because of habitat loss caused by agricultural and urban development, levee construction, pumice mining, overgrazing by cattle, competition with nonnative weeds, road widening, and ORV (off-road vehicle) use. One population is protected under a conservation agreement between The Nature Conservancy and the U.S. Bureau of Reclamation. The remaining populations continue to be threatened by all these activities (CDFG 1992). This species was listed as endangered by the California Department of Fish and Game in 1981, and the California Native Plant Society has placed it on List 1B (rare or endangered throughout its range).

Hoover's Spurge (*Chamaesyce hooveri*)

Species Description and Life History: Hoover's spurge was listed as threatened on March 26, 1997 (62 FR 14338). It is a prostrate, tap-rooted, annual herb in the spurge family (Euphorbiaceae) that forms mats from a few inches to a few feet across. The flowering structure is a small, highly simplified cup-like "cyathium," as in all other spurges (*Chamaesyce* and *Euphorbia*). The flowering structure in Hoover's spurge has petal-like glands that are red to olive in color. *Chamaesyce hooveri* is readily distinguished from other species in the genus by characteristics of growth habit, plant color and leaf shape. It is distinguished from *Euphorbia* on the basis of growth habit, vascular anatomy, and photosynthetic pathway (Stone *et al.* 1988).

Hoover's spurge occurs in relatively large, deep vernal pools among the rolling hills, remnant alluvial fans and depositional stream terraces at the base of the Sierra Nevada foothills. It tends to occur where competition from other species has been reduced by prolonged seasonal inundation or other factors (Stone *et al.* 1988).

Historic and Current Distribution: This species is endemic to vernal pool complexes in the eastern Central Valley. Its historical distribution is not well documented, but it is thought to have been more common than at present among the vernal pools of the eastern Sacramento and San Joaquin Valleys. Approximately 25 extant occurrences form three clusters: one in Tehama, Butte, and Glenn Counties; another in eastern Stanislaus and Merced Counties; and another in northwestern Tulare County (Stone *et al.* 1988, Natural Diversity Data Base 1993).

Reasons for Decline and Threats to Survival: Loss of vernal pool habitat to irrigated agriculture has probably caused most of the decline in this species. Continued expansion of agricultural development threatens about one-third of the remaining populations. Moderate intensities of livestock grazing appear not to threaten the plant. However intensive grazing and trampling of vernal pools could harm it. All remaining populations are on privately owned lands except the

four populations in Glenn County, which are found on the Sacramento National Wildlife Refuge. A few populations are protected at TNC's Vina Plains Preserve in Tehama County.

Hoover's woolly star (*Eriastrum hooveri*)

Species Description and Life History: The Hoover's woolly-star was listed as threatened on July 19, 1990 (55 FR 29361). Belonging to the phlox family (Polemoniaceae), it is an annual herb that has wiry stems varying in height from 0.4-8.0 inches, and threadlike leaves. Hoover's woolly star has tiny white to pale blue flowers that are nearly hidden in tufts of woolly hair. This plant is addressed in the Upland Species Recovery Plan (USFWS 1998).

Optimal habitats are characterized by stabilized silty to sandy soils, a low cover of competing herbaceous vegetation, and the presence of a cryptogamic crust; however, it also has been found on loamy soils, in areas of dense vegetation, and in areas lacking cryptogamic crust. Hoover's woolly star may re-invade disturbed soil surfaces within one year after disturbance ceases if seed sources remain in the vicinity, and may actually benefit from light to moderate soil disturbance in areas that are densely vegetated with nonnative vegetation. Populations of Hoover's woolly star occur in alkali sinks, washes, ridge tops, and north- and south-facing slopes in a wide variety of plant communities, but typically in areas with less than 20 percent shrub cover.

Seeds of Hoover's woolly star typically germinate later in the growing season than do those of many associated annual plants. Seedlings may emerge from January or February until mid-April; flowering may extend from March into June. The tiny seeds are probably dispersed by wind or by tumbling of dead stems, which may persist until the next growing season. Preliminary studies have suggested that both competition from exotic plants and spring grazing reduced survival rates, but not flower production. Trampling also has been observed to reduce survival in areas where livestock congregate; however, grazing is thought to be a potentially useful management tool to control competition from nonnative plants.

Historic and Current Distribution: Hoover's woolly star was historically distributed in the Temblor Range (Kern and San Luis Obispo Counties), Cuyama Valley (San Luis Obispo and Santa Barbara Counties), and discontinuously in the San Joaquin Valley from Fresno County south, excluding the vicinity of Tulare Lake. Field surveys conducted throughout the southern San Joaquin Valley by Federal agencies and private consultants since 1986, have documented numerous occurrences of Hoover's woolly-star. Hoover's woolly star is now known from Kings and San Benito counties and at many additional sites in the four original counties. Most of the sites occur within four metapopulations which are, in order of largest to smallest a) Kettleman Hills in Fresno and Kings counties, b) Carrizo Plain-Elkhorn Plain - Temblor Range - Caliente Mountains - Cuyama Valley - Sierra Madre Mountains in San Luis Obispo, Santa Barbara, and western Kern counties, c) Lokern - Elk Hills - Buena Vista Hills - Coles Levee - Taft - Maricopa in Kern County, and d) Antelope Plain - Lost Hills - Semitropic in Kern County. Small, isolated populations occur in scattered areas in Fresno, Kern, and San Benito counties. The majority of known locations are on Bureau of Land Management (BLM) land or on combinations of BLM/split-estate/private.

Reasons for Decline and Threats to Survival: Occurrences of Hoover's woolly star in the vicinity of Buttonwillow, Lost Hills, Rosedale and sites along Interstate Highway 5 are threatened by commercial development. Agricultural conversion continues to threaten several populations on the Valley floor. Flooding resulting from high precipitation, groundwater recharge, agricultural wastewater diversion or waterfowl management, could destroy populations in low-lying areas. Dense growth of vegetation, such as in areas where nonnative grasses dominate or where fire has been suppressed, may create conditions unsuitable for Hoover's woolly star. Petroleum production does not pose a threat in many cases, but could be detrimental if large areas of occupied habitat were disturbed. In particular, privatization of the Naval Petroleum Reserve near Taft could lead to greater surface disturbance if exploration and production rates were increased, and current avoidance and minimization measures applied by Federal operators of the Reserve were no longer used.

Keck's Checker-mallow (*Sidalcea keckii*)

Species Description and Life History: The Keck's checker-mallow was listed as endangered on February 16, 2000 (65 FR 7757). It is a slender, hairy, erect, annual herb in the mallow family (Malvaceae). The plant grows 6 to 13 inches tall. Lower leaf blades have seven to nine shallow lobes. Upper leaves have a tapered base with two to five notches in the upper lobes. A few deep pink flowers appear in April through May. The seeds are smooth and pink-tinted. This species can easily be confused with other *sidalceas*. Keck's checker-mallow can be distinguished by the number and size of flowers, the arrangement of stamens, the lengths of the bracts and calyx, the presence of an aggregation of linear stipules and bracts surrounding the flower at maturity, the size and shape of the stem leaves, the density of hairs on the stems, and the presence of a purplish spot on the flower.

Historic and Current Distribution: Keck's checker-mallow was known from two populations ranging in elevation from 400 to 1400 feet in Tulare and Fresno Counties. The type locality is thought to be extirpated due to urbanization. The entire species was thought to be extinct until John Stebbins and Karen Kirkpatrick found a population south of Lake Success in 1992 (Woodward and Clyde, Biological Consultants, 1992). This single remaining population consisted of 60 plants in 1992 and covered an area measuring 100 by 320 feet on heavy-clay, sparsely covered grass slopes that range from 20 to 40 percent slope. The clays are thought to be serpentine-derived and the elevation range is 800 to 900 feet.

Reasons for Decline and Threats to Survival: Threats include urban development, agricultural land conversion and livestock grazing. *Sidalcea keckii* is extremely localized with only one small population of approximately 60 individuals. This species is, therefore, highly susceptible to extinction from naturally occurring events such as fire, insect predation, and disease outbreaks. The California Native Plant Society has placed it on List 1B (rare or endangered throughout its range).

Kern Mallow (*Eremalche kernensis*)

Species Description and Life History: Kern mallow was listed as an endangered species in 1990 (55 FR 9361), and is addressed in the Upland Species Recovery Plan (USFWS 1998). It is a small, annual herb belonging to the mallow family (Malvaceae) and has predominantly white flowers that sometimes range to pale lavender. Kern mallow seeds typically germinate in January and February, and plants begin flowering in March. Fruit production begins within a few days after flowers appear. Flowering and fruit production may continue into May under favorable moisture and temperature conditions. Seed dispersal agents are unknown, but may include animals and wind. Kern mallows are believed to be pollinated by insects, but may also be pollinated through apomixis or wind pollination. Like many annual plants, population size of Kern mallow varies with rainfall and has been observed to fluctuate dramatically from one year to another, to the point that it may not be detected at all at known locations in years of below-average rainfall.

Historical and Current Distribution: Kern mallow is known from a single metapopulation consisting of intermittent occurrences within an area of approximately 40 square miles within valley saltbush scrub habitat in Lokern, at the eastern base of the Temblor Range, from the vicinity of McKittrick to near Buttonwillow (Taylor and Davilla 1986, Service 1997). The species typically occurs in valley saltbush scrub communities, where it grows under around spiny and common saltbushes and in patches with other herbaceous plants. Kern mallow typically grows in areas where shrub cover is less than 25%, on alkaline sandy loam or clay soils at elevations of 315 to 900 feet.

Reasons for Decline and Threats to Survival: Approximately 85% of the Kern mallow habitat in Lokern is privately owned and is vulnerable to effects of various land uses, particularly oil and gas exploration and development. Although the current level of petroleum production, as practiced with Kern mallow impact avoidance and minimization measures implemented by private companies as well as in BLM-authorized actions, does not seem to significantly threaten the remaining portion of the Kern mallow metapopulation, increased production levels could cause further habitat fragmentation and loss of localized Kern mallow colonies.

Least Bell's Vireo (*Vireo belli pusillus*)

Species Description and Life History: The least Bell's vireo was listed as a federally endangered species on May 2, 1986 (51 FR 16474). Critical habitat was designated for the species on Santa Ynez River (Santa Barbara County), Santa Clara River (Ventura and Los Angeles Counties), Santa Ana River (Riverside and San Bernardino Counties), and Santa Margarita River, San Luis Rey River, Sweetwater River, San Diego River, Tijuana River, Coyote Creek and Jumul-Dulzura Creeks (San Diego County).

The least Bell's vireo is a small gray, migratory passerine bird. Above it is ash-gray; below it is pure white, with occasionally a light shade of brownish gray on the breast; the sides under the wings are moderately tinged with sulphur yellow. It has a narrow, short streak above the eye, while the edges of the eyelids, two bands on the wings, and narrow margins on the outer border of the wings and tail are dull white; with an olive tinge on the tail.

Historic and Current Distribution: Once widespread and abundant as a nesting species throughout the Central Valley and other low-elevation riverine valleys, the least Bell's vireo historically ranged from interior northern California near Red Bluff, Tehama County, to northwestern Baja California, Mexico. It has been largely extirpated from the Sacramento and San Joaquin Valleys, although a single territorial male was observed along the South Fork of the Kern River in 1992 and 1994. Its breeding range is now restricted to San Diego, Riverside, San Bernardino, Inyo, Los Angeles, Santa Barbara and Ventura Counties, although there may still be a few breeding areas in San Benito and Monterey Counties. In 1997 a nest was reported from Gilroy in Santa Clara County. Least Bell's vireos primarily inhabit dense, willow-dominated riparian habitats with lush understory vegetation.

Reasons for Decline and Threats to Survival: The main reason for decline of the species is the loss of riparian habitat throughout its range. Efforts are currently underway to develop a series of Habitat Conservation Plans for the Sweetwater Reservoir/River, San Diego River and San Luis Rey River. Development of these plans is being coordinated by the San Diego Association of Governments and involves agencies, developers, landowners, and conservation organizations.

Longhorn Fairy Shrimp (*Branchinecta longiantenna*)

Species Description and Life History: The longhorn fairy shrimp was listed as federally endangered on September 19, 1994 (59 FR 48136). It is in the Order Anostraca, Family Branchinectidae. It is endemic to a portion of California, with a very restricted known range. The longhorn fairy shrimp is so named because its second antennae are much longer relative to its body than other species of *Branchinecta*, measured antennae have ranged from 6.7 millimeters to 10.4 millimeters.

As the name implies, the most obvious distinguishing characteristic of *B. longiantenna* is the relatively elongate second antennae of the males. The antenna's distal segment is flattened in the antero-posterior plane rather than the latero-medial plane as in other *Branchinecta*.

Historical and Current Distribution: The longhorn fairy shrimp currently has a very restricted and disjunct range; known sites exist only along the eastern edge of the Central Coast Mountains Region in three widely separated areas. The type specimens for *B. longiantenna* were collected in 1982 in Contra Costa County; however, there is a specimen from Alameda County (USNM 213714), collected in 1937. There are no records of previous occurrences of *B. longiantenna* outside the current distribution, so it is not clear if its distribution was ever wider than it is now. A series of sandstone pools in Contra Costa County, and one pool in Alameda County within 10 kilometers of each other represent the northernmost populations. Kesterson National Wildlife

Refuge, in Merced County, also contains pools with the longhorn fairy shrimp. The southernmost occurrence of *B. longiantenna* is near Soda Lake in San Luis Obispo County. Very little is known about the ecology of the longhorn fairy shrimp, which has been found from late December to mid May. It is a relatively slow growing species of *Branchinecta*. Under the culturing conditions, it required a minimum of 23 days, but averaged 43 days, to reach maturity in artificial pools.

Habitat Requirements and Reasons for Decline: The longhorn fairy shrimp occupies two kinds of vernal pools. Its northern populations are found in small, clear water sandstone basins or potholes. At Kesterson and Soda Lake, it is found in grassland pools that may be clear to turbid, and covered with grasses and low shrubs during the dry summers. Little environmental data are available from *B. longiantenna* pools. Pool size does not appear to be critical for the longhorn fairy shrimp. The sandstone potholes it occupies are sometimes no larger than 1 meter in diameter, while grassland pools as large as 62 meters across contain this fairy shrimp. No vascular plants occur in the sandstone potholes, but the grassland vernal pools lie in swales of short grass or grass and low shrub vegetation. In the Kesterson area, the longhorn fairy shrimp is often found in the same general area as *B. conservatio*, *B. lynchi*, and *B. lindahli*, but co-occurrence in the same pool at the same time has only been limited to a few observations with *B. lynchi*.

It is not clear, given our very limited knowledge about the longhorn fairy shrimp, whether its populations have declined to a few refugia from a once wider distribution, or the species represents a rather narrow endemic with a very restricted, but disjunct range. Habitat alteration and degradation has occurred near existing populations, and some *B. longiantenna* pools may have been lost. The longhorn fairy shrimp is extremely rare and uncommon in the pools it does occupy. Because of these traits, the species is at risk of extinction, even if just from stochastic natural events. As with all the other vernal pool inhabitants, the greatest threat to survival of the longhorn fairy shrimp is habitat destruction. The Kesterson populations are probably at relatively low risk because they are within a National Wildlife Refuge, and the significance of vernal pools is now recognized and incorporated into management of the area. However, additional occurrence outside the Refuge is undocumented and potential habitat is very likely to be converted or degraded inadvertently.

Little Kern Golden Trout (*Oncorhynchus mykiss whitei*)

Species Description and Life History: The Little Kern golden trout was listed as a threatened species on April 13, 1978. Critical habitat was designated for the species concurrently. Little Kern golden trout have bright red to red-orange bellies and cheeks, bright gold lower sides, red-orange lateral bands, deep olive green backs, and profuse spots on their backs and tails.

Little Kern golden trout require diverse habitats composed of pools, instream cover, shade from bankside vegetation, and gravel substrates for spawning. Ideal habitat includes deep, narrow channels in low gradient meadow environments. In these environments suitable habitat is characterized by low width to depth ratios and a large percentage of undercut banks. Boulders and cobbles are important cover habitats in areas without meadows. Critical Habitat consists of the entire Little Kern River basin upstream from a barrier falls located one mile below the mouth of Trout Meadows Creek.

Historic and Current Distribution: Prior to European settlement, the Little Kern golden trout occupied the main stem of Little Kern river and its tributaries upstream of a natural barrier (UC Davis 2000). Habitat modification and the introduction of rainbow and brown trout significantly impacted the Little Kern golden trout. By the 1980's fewer than 5,000 Little Kern golden trout existed in less than 11 miles of streams within the Little Kern River basin. Through recovery efforts, the species have been restored through much of its historic range in the Little Kern River, whose watershed is entirely within the boundaries of Sequoia National Park and Sequoia National Forest in Tulare County, California. The Little Kern golden trout is also found in areas outside of its historical range (such as Coyote Creek, Sequoia National Park) as the result of unauthorized "coffee pot" transplants.

Reason for Decline and Threats to Survival: At the time of listing, major threats to the survival of the species were identified as: 1) habitat modification due to logging, roads, off-road vehicles, mineral extraction, and livestock; and 2) the effects of introduced trout. The introduction of non-native trout into the Little Kern River basin negatively impacted the Little Kern golden trout by (1) displaced from much of their historical range. Hybridization between Little Kern golden trout and rainbow trout was observed by the early 1940's, but due to impassable fish barriers common throughout the Little Kern River basin, isolated populations of genetically pure Little Kern golden trout persisted.

The California Department of Fish and Game (CDFG) wrote a management plan for Little Kern golden trout that was accepted as the official recovery plan for this species by the Service. By the late 1990's, recovery efforts by CDFG, U.S. Forest Service, and National Park Service had achieved their goal of eliminating non-native trout in approximately 90 miles of stream habitat and eight lakes within the Little Kern River basin. Recovery goals of restoring genetically pure Little Kern golden trout to these areas were on the verge of being attained when genetic impurities were detected in two areas causing a major setback. In one of these areas, illegal introduction of non-native trout was believed responsible. In the other, some Little Kern golden trout hatchery broodstock used to restock the area may have been genetically impure. As of the end of 1998, results of genetic testing to determine the extent of genetic contamination were still pending.

Because almost all of the historical range of Little Kern Golden trout is now within federal ownership, a unique opportunity exists to protect the species. The threat to recovery today is the degradation of water quality in the Little Kern River due to pesticide drift from the San Joaquin Valley, and from pesticide treatment of livestock that use the tributaries to the Little Kern River.

Mountain Plover (*Charadrius montanus*)

Species Description and Life History: The mountain plover was proposed for listing as threatened on February 16, 1999 (64 FR 7587). It is a medium-sized (8 to 9-inch long), dull brown shorebird that occurs in grassy upland habitats. During the breeding season the bird prefers level areas with short grass (buffalo grass and blue grama) and cactus. Grazing may be beneficial to the mountain plover, as it reduces vegetation height. In mid- and tallgrass prairies, the species is associated with prairie dog towns. It can breed in loose colonies, with breeding areas shifting year to year (Graul 1975, Knowles *et al.* 1982). From 2-4 eggs are laid in a rudimentary nest (a slight depression in open ground). On the wintering grounds, mountain plovers congregate in flocks of fifteen to several hundred birds, feeding in alkaline flats, grazed pastures and plowed fields. Their diet consists primarily of insects, including beetles, grasshoppers and flies.

Historic and Current Distribution: The mountain plover formerly bred throughout the dry prairies of the western Great Plains from Montana to New Mexico and Texas. Nearly half the remaining breeding population is now found in Weld County, Colorado (Pawnee National Grassland) and Phillips County, Montana. Distribution elsewhere is very local. Wintering birds are found in California (Sacramento and San Joaquin Valley and Southern California), Arizona, Texas, and northern Mexico (Graul and Webster 1976, AOU 1983). Wintering populations of plovers in California have been declining (Garrett and Dunn 1981, Andrews and Righter 1992). Breeding Bird Surveys from 1966-1987 show a 61 percent range wide decline in mountain plover populations.

Reasons for Decline and Threats to Survival: Conversion of native prairies to croplands has significantly reduced the availability of suitable habitats for this species, producing a significant decline in the continental population. Secondary effects of pesticides on breeding behavior and reproductive success may also be contributing to the population decline.

Mountain Yellow-legged Frog (*Rana muscosa*)

Description of Species: The mountain yellow-legged frog is moderate in size, approximately 40-80 millimeters (1.5-3.25 inches) in length. Dorsal coloration and patterning are highly variable, with coloration varying from dark brown, gray, red, or green-brown (Jennings and Hayes 1994). The dorsal patterns range from discrete or poorly defined dark spots that are few and large, to small and numerous spots with a mixture of size and shapes (Zweifel 1955). The ventral surface and under surface of the hind limbs are yellow. Dorsolateral folds are present, but not usually prominent. The mountain yellow-legged frog has no vocal sacs.

The mountain yellow-legged frog is found in glaciated lakes, ponds, springs, and streams in the Sierra Nevada in elevations extending from 1370 meters to 3650 meters. Habitat typically associated with this species include lodgepole pine, yellow pine, sugar pine, white fir, whitebar

pine, and wet meadow vegetation associations. Although found in a wide range of stream types and classes, the species seem to prefer streams of low gradient and slow to moderate flow.

Mountain yellow-legged frog breed in June or July, soon after ice melt (Wright and Wright 1949; Zweifel 1995). Females deposit clumps of eggs attached to rocks, gravel, vegetation, or under banks (Zweifel 1955). Tadpoles overwinter at least once before metamorphosis. Eggs typically hatch in 18 to 21 days. Depending on elevation and length of summer, larvae may take as long as four summers to metamorphose (Center for Biological Diversity 2000). Due to the long metamorphosis period, the species need breeding site that are wet throughout the year and are free of predatory fish. Reproductive maturity and longevity are unknown.

Large adults feed preferentially on terrestrial insects (Bradford 1983). Adults are typically found sitting on rocks along the shoreline, usually where there is little or no vegetation. Most frogs are seen on wet substrates within 1 meter of the water's edge. Adults are also thought to feed on tadpoles of Yosemite toads, Pacific tree frogs, and conspecifics (Heller 1960). Larvae are probably algae grazers.

Historical and Current Distribution: The mountain yellow-legged frog was historically the most abundant frog in the Sierra Nevada. It was ubiquitously distributed in high elevation water bodies from southern Plumas County to southern Tulare County (Jennings and Hayes 1994). Recent surveys have found that the frog has disappeared from 70 to 90 percent of its historic localities. The remaining populations are geographically isolated and consists of few breeding individuals (Center for Biological Diversity 2000).

Reason for Decline and Threat to Survival: Most of the known habitats for the mountain yellow-legged frog are within National Forests, National Parks and Wilderness Areas. However, human activities such as fish stocking, the introduction of bullfrogs, chemical pollution, and cattle grazing are adversely impacting their habitats.

Recent research by U.S. Geological Survey have documented transport of pesticides used in the Central Valley to the Sierra Nevada via wind currents. The first observed decline of the species was correlated with the use of second generation pesticides in the 1970's. Cattle grazing in National Forests have altered and continues to alter the hydrology and riparian vegetation of many sites that currently are or previously were suitable frog habitat. The introduced bullfrog predated upon many species of native frogs, including the yellow-mountain legged frog. Other factors contributing to the decline of the species include disease, acid rain, predation, and natural fluctuation in precipitation.

Perhaps one of the most significant factors of mountain-yellow-legged frog decline is the sport fish stocking program implemented by the California Department of Fish and Game (CDFG). Predatory fish did not historically occupy much habitat in high elevations. However, trout stocking programs beginning in the late nineteenth century has resulted in significant frog predation, and is likely to prevent recolonization of extirpated sites unless control measure are implemented (Bradford 1989, 1993). CDFG does not have policy to avoid stocking lakes where

mountain yellow-legged frog are present (Center for Biological Diversity 2000). In 1993, the species was reintroduced into and successfully overwintered in Maul Lake in Hall Research Natural Area after it was cleared of fish. In the summer of 1994, however, thousands of fingerling trout was air dropped into the lake by the CDFG, thus terminating the project (Parker 1994).

Palmate-bracted Bird's-Beak (*Cordylanthus palmatus*)

Species Description and Life History: Palmate-bracted bird's-beak was listed as endangered on July 1, 1986 (51 FR 23767). Palmate-bracted bird's-beak is an annual herb in the snapdragon family (Scrophulariaceae). The plants are 4-12 inches tall and branched from near or above the base of the stem. The stems and leaves are grayish green and sometimes covered with salt crystals. The small pale whitish flowers, ½-inch to 1 inch long, are arranged in dense clusters (spikes) and densely surrounded by herbaceous leaflike bracts. Seedlings grow in late March or April. Flowers bloom from late spring through summer. Like other members of *Cordylanthus* and related genera, it is hemiparasitic (partially parasitic) on the roots of other plants.

Palmate bracted bird's-beak grows on seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations of less than 500 feet. Within these areas, palmate-bracted bird's-beak grows primarily along the edges of channels and drainages, with a few individuals scattered in seasonally-wet depressions, alkali scalds (barren areas with a surface crust of salts), and grassy areas. Palmate-bracted bird's-beak occurs in the Valley Sink Scrub and Alkali Meadow natural communities in association with other halophytes such as iodine bush (*Allenrolfea occidentalis*), alkali heath (*Frankenia salina*), glasswort (*Salicornia subterminalis*), seepweed (*Suaeda moquinii*) and salt grass (Bittman 1985, 1986a, Holland 1986, Coats *et al.* 1993, CDFG 1995). Population fluctuations are common in the palmate-bracted bird's-beak, and may be a result of changes in pollination success, rainfall patterns, freshwater influence and marsh pollution.

Historic and Current Distribution:

Historically, the species is known from scattered locations in Fresno and Madera Counties in the San Joaquin Valley, San Joaquin, Yolo, and Colusa Counties in the Sacramento Valley and the Livermore Valley area of Alameda County. It is currently known to occur in seven locations in the Sacramento, Livermore and San Joaquin Valleys. In approximate order from north to south, these are Sacramento National Wildlife Refuge (NWR) in Glenn County, Delevan NWR in Colusa County, Colusa NWR in Colusa County, the Woodland area, Springtown Alkali Sink near Livermore, western Madera County, and the combined Alkali Sink Ecological Reserve and Mendota Wildlife Management Area. The total occupied surface area over the seven locations is estimated at less than 741 acres. The Delevan NWR and Colusa NWR locations account for approximately 80% of the total number of individuals and the Springtown Alkali Sink meta-population accounts for another 19% (Center for Conservation Biology (CCB) 1994, CDFG 1995).

Reasons for Decline and Threats to Survival: Saline-alkali soils and alkali sink scrub habitats were historically rare throughout central California, but have been greatly reduced in extent by soil reclamation and draining of seasonal wetlands, conversion of land to agricultural use, urbanization, livestock grazing, and more recently by off-road vehicle use and trash dumping (CDFG 1992). The rarity of saline-alkali soils with natural vegetation and the intensive agricultural and urban development within the species' range make the likelihood of finding additional colonies remote.

Riparian Brush Rabbit (*Sylvilagus bachmani riparius*)

Species Description and Life History: The riparian brush rabbit was proposed for listing as endangered on November 21, 1997 (62 FR 62276). *Sylvilagus bachmani riparius* is one of 13 subspecies of *S. bachmani*. The riparian brush rabbit is a medium to small cottontail with color varying from dark brown to gray above to white underneath. The sides of the rostrum (nasal/upper jaw region of the skull) are noticeably convex when viewed from above instead of straight or concave as in all of the other subspecies (Orr 1940).

Habitat for the riparian brush rabbit consists of riparian forests with a dense understory shrub layer. Common plants in the habitat include California wild rose (*Rosa californica*), Pacific blackberry (*Rubus vitifolius*), wild grape (*Vitis californica*), Douglas' coyote bush (*Baccharis douglasii*) and various grasses (Williams 1988, Basey 1990). Brush rabbits have small home ranges that usually conform to the size of available brushy habitat (Basey 1990).

Historic and Current Distribution: The riparian brush rabbit inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus rivers in the northern San Joaquin Valley, California. Because the subspecies was not described until after it is believed to have been extirpated from most of its historic range, definitive information on its former distribution is lacking. It apparently has been extirpated from the Sacramento-San Joaquin River Delta and most of the lower San Joaquin River and its tributaries--the Stanislaus, Tuolumne, and Merced rivers (Williams 1986). The range of the subspecies probably extended farther upstream than the Merced River, assuming that suitable habitat historically occurred along the length of the San Joaquin River system (Williams and Basey 1986).

The riparian brush rabbit is currently restricted to a single population at Caswell Memorial State Park, San Joaquin County, along the Stanislaus River (Williams and Basey 1986). Surveys conducted in all potential habitat along the Merced, San Joaquin, Stanislaus and Tuolumne rivers during 1985 and 1986 failed to find any additional populations of riparian brush rabbits (Williams 1988). Recent peak population estimates are from 88 to 452 individuals (Williams 1988), 320 to 540 individuals (Basey 1990), and 170-608 individuals over 198 acres (Williams 1993). Williams (1988) estimated a population low of 10 or fewer individuals following severe winter flooding in 1985-86. The flooding during the winter of 1996-7 has also severely affected the population.

Threats to Survival and Reason for Decline: Potential threats to this species include habitat conversion to agriculture, wildfire, disease, predation, flooding, clearing of riparian vegetation, and the use of rodenticides. There has been a statewide reduction of riparian communities by nearly 90 percent (Katibah 1984) due to elimination and modification of riparian forests along valley floor river systems to urban, commercial, and agricultural development, wood cutting, reclamation and flood control activities, heavy groundwater pumping, river channelization, dam building, and water diversion. The species is at risk from the lack of elevated mounds with protective cover to serve as flood refuges within remaining riparian habitat.

Riparian Woodrat (*Neotoma fuscipes riparia*)

Species Description and Life History: The riparian woodrat was proposed as a federally endangered species on November 21, 1997 (62 FR 62276). It is one of 11 subspecies of *N. fuscipes*. It is a medium sized rodent that is predominantly gray and cinnamon above and whitish beneath, with white hind feet and a tail that is well furred, not scaled and more distinctly bicolored (lighter below contrasting more with the darker dorsal color) (Hooper 1938).

Riparian woodrats are most numerous where shrub cover is dense and least abundant in open areas. In riparian areas, highest densities of woodrats and their houses are often encountered in willow thickets with an oak overstory. They are common where there are deciduous valley oaks, but few live oaks. Mostly active at night, the woodrat's diet is diverse and principally herbivorous, with leaves, fruits, terminal shoots of twigs, flowers, nuts, and fungi. The young are born in stick nest houses, or lodges, on the ground, which measure 2 to 3 feet high and 4 to 6 feet in diameter. Most lodges are positioned over or against logs (Cook 1992, cited in Williams 1993). Unlike other subspecies, the riparian woodrat occasionally builds nests in cavities in trees and artificial wood duck nest boxes (Williams 1986).

Historic and Current Distribution: The riparian woodrat inhabits riparian communities along the lower portions of the San Joaquin and Stanislaus rivers in the northern San Joaquin Valley, California. Historical records for the riparian woodrat are distributed along the San Joaquin, Stanislaus, and Tuolumne rivers, and Corral Hollow, in San Joaquin, Stanislaus, and Merced counties (Hooper 1938, Williams 1986). Thus, before the statewide reduction of riparian communities by nearly 90 percent (Katibah 1984), the riparian woodrat probably ranged throughout the extensive riparian forests along major streams flowing onto the floor of the northern San Joaquin Valley. Riparian woodrat populations today are greatly depleted, with the only known population at Caswell Memorial State Park with a possible second population near Vernalis, San Joaquin County. Williams (1993) estimated a peak population at Caswell of 437 animals, based on mean density of 4.8 woodrats per ha on 223 acres of suitable habitat.

Reason for Decline and Threats to Survival: Potential threats to this species include habitat conversion to agriculture, wildfire, disease, predation, flooding, drought, clearing of riparian vegetation, use of rodenticides and browsing and trampling by ungulates. There has been a statewide reduction of riparian communities by nearly 90 percent (Katibah 1984) due to elimination and modification of riparian forests along valley floor river systems to urban,

commercial, and agricultural development, wood cutting, reclamation and flood control activities, heavy groundwater pumping, river channelization, dam building, and water diversion.

Sacramento Splittail (*Pogonichthys macrolepidotus*)

Species Description and Life History: The Sacramento splittail was listed as threatened in 1999 (64 FR 5963). The Sacramento splittail is included in the Recovery Plan for Sacramento/San Joaquin Delta Native Fishes (Service 1995).

Splittail are large fish in the cyprinid family (Cyprinidae), growing to more than 12 inches, and are distinctive in having the upper lobe of the caudal fin larger than the lower lobe. The body shape is elongate with a blunt head. Small barbels may be present on either side of the subterminal mouth. They possess 14 to 18 gill rakers, and their pharyngeal teeth are hooked and have narrow grinding surfaces. Dorsal rays number from 9-10, pectoral rays 16-19, pelvic rays 8-9, and anal rays 7-9. The lateral line usually has 60-62 scales, but ranges from 57-64. The fish are silver on the sides and olive grey dorsally. Adults develop a nuchal hump (*i.e.*, protuberance on the fishes' nape). During the breeding season, the caudal, pectoral, and pelvic fins take on a red-orange hue and males develop small white nuptial tubercles in the head region.

Splittail are primarily freshwater fish, but are tolerant of moderate salinities and can live in water with salinities of 10-18 parts per thousand. They are relatively long-lived (about 5-7 years) and are highly fecund (up to 100,000 eggs per female). Both male and female splittail mature by the end of their second year, although occasionally males may mature by the end of their first year and females by the end of their third year. Fish are about 7-8 inches when they attain sexual maturity (Service 1995).

In the tidal freshwater and euryhaline habitats of the Sacramento-San Joaquin estuary, spawning occurs by late January and early February and continues through July. Splittail spawn on submerged vegetation in temporarily flooded upland and riparian habitat. Typically terrestrial shrubs and herbs are preferred over emergent wetland vegetation such as cattails and tules. Spawning occurs in the lower reaches of rivers, bypasses used for flood management, dead-end sloughs and in the larger sloughs such as Montezuma Slough. Larvae remain in the shallow, weedy areas inshore near the spawning sites and move into the deeper offshore habitat as they mature. Splittail are benthic (bottom) foragers, which feed extensively on opossum shrimp (*Neomysis mercedis*) (Service 1995).

Historic and Current Distribution: Sacramento splittail are endemic to California's Central Valley where they were once widely distributed in lakes and rivers (Moyle 1976). Historically, Sacramento splittail were found as far north as Redding on the Sacramento River and as far south as the site of Millerton Lake (current site of Friant Dam) on the San Joaquin River (Rutter 1908). Rutter (1908) also found Sacramento splittail as far upstream as the current Oroville Dam site on the Feather River and Folsom Dam site on the American River. Sacramento splittail were common in San Pablo Bay and Carquinez Strait following high winter flows until about 1985 (Messersmith 1966, Moyle 1976, and Wang 1986).

The Sacramento splittail is found in the Sacramento River and Delta and is thought to be limited in its northward extent by the Red Bluff Diversion Dam in Tehama County. Splittail are now largely confined to: (1) the Delta, (2) Suisun Bay, (3) Suisun Marsh, (4) Napa River, (5) Petaluma River, and (6) other parts of the Sacramento-San Joaquin estuary (Turner 1966). On the San Joaquin River, a small number of splittails are found in tributaries below the confluence of Merced River. The distribution of splittails in the San Joaquin River may be limited in part by poor water quality, as the fishes move into the river only during wet years (US Fish and Wildlife Service 1996).

Reasons for Decline and Threats to Survival: The reason for decline in the San Joaquin River is mainly attributed to the loss of spawning habitat associated with the Central Valley Project and degradation of water quality in the San Joaquin River from increased agricultural practices (Service 1996). Recent declines from 1985 to 1992 in Sacramento splittail abundance in the Delta is concurrent with hydrologic changes to the Estuary. These changes include increases in water diversions during the spawning period from January through July. Diversions, dams and reduced outflow, coupled with severe drought years, introduced aquatic species, and loss of wetlands and shallow-water habitat (CDFG 1992) have reduced the species' capacity to reverse its decline.

A recent concern for the splittail survival is the recent decline in fitness and health of adult splittail taken at the pumps. Observation of reduced health and vigor, concurrent with increased dairy production and the reopening of the grasslands bypass, has led to speculation that selenium or some other toxic substance is impacting the species.

San Joaquin Adobe Sunburst (*Pseudobahia peirsonii*)

Species Description and Life History: San Joaquin adobe sunburst was listed as threatened on February 6, 1997 (62 FR 5542). It is a slender, woolly annual in the sunflower family (Asteraceae). It has branching stems 4-24 inches tall, with leaves twice divided into smaller segments (bipinnatifid), and yellow ray flowers. *Pseudobahia peirsonii* is distinguished from other species of *Pseudobahia* by characteristics of the phyllaries and leaves.

San Joaquin adobe sunburst is restricted to heavy adobe clay soils. These soils may be favored for their ability to hold moisture longer into the summer dry season than other soils. The adobe sunburst grows in grasslands dominated by nonnative annual grasses, wild oats (*Avena fatua*), mustard (*Brassica kaber*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*) and fiddleneck (*Erodium cicutarium*). The intrusive and aggressive nature of these herbaceous weeds seems detrimental to the quality of habitat for the San Joaquin adobe sunburst.

Historical and Current Distribution: San Joaquin adobe sunburst is restricted to the eastern San Joaquin Valley. Historical occurrences were scattered from northern Kern County to Tulare and Fresno Counties (CDFG 1992). Today the species is limited to 34 populations in valleys and flats and the foot of the Sierra Nevada. Extant populations are concentrated in three areas: the Round Mountain-Wahtoke area in Fresno County (where the two largest populations occur), the

Porterville-Visalia region in Tulare County, and the Pine Mountain-Woody region in Kern County. Seventeen of the 34 known occurrences contained fewer than 250 plants in 1991.

Reasons for Decline and Threats to Survival: Agricultural development, urbanization, flood control projects, transmission line maintenance, and heavy grazing by cattle and sheep have eliminated 13 historically known populations. Conversion of grassland to cropland and construction of associated canals and roads have probably caused the greatest number of population losses. All of the remaining populations are on private land, and most of these are threatened by removal or degradation of habitat. The largest remaining population is threatened by a large residential development and recreational water park. The second largest, on Fancher Creek, is partly threatened by a flood control project. Other sites continue to be threatened by agricultural activities, urbanization, water projects, transmission line and road maintenance, soil erosion, livestock grazing, and competition with nonnative weeds.

San Joaquin Kit Fox (*Vulpes macrotis mutica*)

Species Description and Life History: The San Joaquin kit fox was listed as endangered on March 11, 1967 (32 FR 4001). The San Joaquin kit fox was listed as endangered by the State of California in 1971. A recovery plan approved in 1983 proposed interim objectives of halting the decline of the San Joaquin kit fox and increasing population sizes above 1981 levels (Service 1983). The San Joaquin kit fox is now included in the Upland Species Recovery Plan (Service 1998).

The San Joaquin kit fox is a small canid, with an average body length of 20 inches and weighing about 5 pounds. They are lightly built, with long legs and large ears. Pelage color ranges from tan to buffy gray in the summer to silvery gray in the winter. The belly is whitish and the tail is black-tipped.

The diet of kit foxes varies geographically, seasonally and annually and includes small to mid-sized mammals, ground-nesting birds, and insects. Dens are used by the fox for temperature regulation, shelter from adverse environmental conditions, and escape from predators. Kit foxes excavate their own dens, use those constructed by other animals, and use human-made structures (culverts, abandoned pipelines, and banks in sumps or roadbeds). Kit foxes often change dens and many dens may be used throughout the year. However, evidence that a den is being used by kit foxes may be absent. Kit foxes are subject to competitive exclusion or predation by other species, such as the nonnative red fox (*Vulpes vulpes*), coyote (*Canis latrans*), domestic dog (*Canis familiaris*), bobcat (*Felis rufus*), and large raptors.

Historic and Current Distribution: In the San Joaquin Valley before 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side. Historically, San Joaquin kit foxes occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. By 1930, the kit fox range had been

reduced by more than half, with the largest portion remaining in the southern and western parts of the Valley. By 1958, an estimated 50% of the Valley's original natural communities had been lost, due to extensive land conversions, intensive land uses, and the use of pesticides. In 1979, only about 6.7% of the San Joaquin Valley's original wildlands south of Stanislaus County remained untilled and undeveloped. Today many of these communities are represented only by small, degraded remnants. Kit foxes are, however, found in grassland and scrubland communities, which have been extensively modified by humans with oil exploration, wind turbines, agricultural practices, and/or grazing. The population is fragmented, particularly in the northern part of the range.

The recovery plan calls for protecting the Carrizo Plain, western Kern County, and the Ciervo-Panoche Natural Area as core populations while reducing their isolation by managing populations on connecting private and public lands through conservation agreements.

Reasons for Decline and Threats to Survival: Loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices continue, decreasing the carrying capacity of remaining habitat and threatening kit fox survival. Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey populations.

San Joaquin Valley Orcutt Grass (*Orcuttia inaequalis*)

Species Description and Life History: The San Joaquin Valley Orcutt grass was listed as threatened on March 26, 1997 (62 FR 14338). It is a small, tufted annual in the grass family (Poaceae). The plant has several stems 2-6 inches tall, ending in a spike-like inflorescence. The foliage is grayish, with soft, straight hairs. San Joaquin Valley Orcutt grass is distinguished from other *Orcuttia* species by the shape of the lemma (part of the grass flower) and by the hat-like shape of the inflorescence at maturity. The plant occurs in vernal pools.

Historical and Current Distribution: San Joaquin Valley Orcutt grass is the only Orcutt grass restricted to the San Joaquin Valley. Historically, its range included the eastern margin of the valley from Stanislaus County to Tulare County. At least half these populations have been extirpated, including all of those in Stanislaus and Tulare Counties. Today, only 23 remaining populations are known, mostly in a 36-mile-long strip in Fresno, Merced, and Madera Counties (Stone et al. 1988).

Two populations of San Joaquin Orcutt grass occur on Federal land; a natural population is managed by the U.S. Bureau of Land Management (BLM), and a translocated population occurs on BLM land. Of the 21 known populations on private land, five are protected through conservation easements with The Nature Conservancy (TNC) on the Flying M Ranch in Merced County. In Fresno County, TNC also protects the Table Mountain site (CDFG 1993).

Reasons for Decline and Threats to Survival: Conversion of grasslands to agricultural use and activities associated with agriculture have eliminated at least five historically known populations

of this species. Urbanization has eliminated at least one additional population. Agricultural and urban development has probably eliminated additional undocumented populations. Several remaining populations continue to be threatened by flood control projects, continued urban and agricultural expansion and competition from nonnative weeds (Stone *et al.* 1988).

San Joaquin Woolly-threads (*Lembertia congdonii*)

Species Description and Life History: The San Joaquin woolly-threads was listed as endangered on July 19, 1990 (55 FR 29361), and is addressed in the Upland Species Recovery Plan (USFWS 1998). It is an annual herb with tiny yellow flower heads clustered at the tips of erect to trailing stems covered with tangled hairs. It is a member of the sunflower family (Asteraceae) and is the only species in the genus *Lembertia*. It is readily distinguished from *Eatonella*, its closest relative, by differences in growth habit, flower and seed morphology, and geographic range. It occurs on neutral to subalkaline soils deposited in geologic times by flowing water. On the San Joaquin Valley floor, it typically is found on sandy or sandy loam soils, whereas in the Carrizo Plain it occurs on silty soils. San Joaquin woolly-threads occupy microhabitats in nonnative grassland, valley saltbush scrub, interior Coast Range saltbush scrub, and upper Sonoran subshrub communities with less than 10 percent shrub cover but in either sparse or dense herbaceous cover. It has been reported from elevations ranging from 200 to 850 feet on the San Joaquin Valley floor, and from 2000 to 2600 feet in San Luis Obispo and Santa Barbara Counties.

The seeds of San Joaquin woolly-threads may germinate as early as November, but usually germinate in December and January. Flowering generally occurs between late February and early April, and may continue into May. Seed production depends on plant size and number of flower heads. In contrast to the more persistent skeletons of Hoover's woolly-star, all trace of San Joaquin woolly-threads plants disappears rapidly after seeds are shed in April or May. Seed dispersal agents are unknown, but may include wind, water and animals. Seed-dormancy mechanisms are thought to allow the formation of a substantial seed bank in the soil.

Historic and Current Distribution: San Joaquin woolly-threads is endemic to the southern San Joaquin Valley and surrounding hills. Its original range extended from southern Fresno and Tulare Counties (excluding the Tulare lakebed) to Bakersfield and Cuyama Valley. San Joaquin woolly-threads currently exists as four metapopulations and several small, isolated populations. The largest metapopulation occurs on the Carrizo Plain, where occupied habitat has been observed to vary from a high of 2800 acres in a favorable year, to much less in years of lower rainfall. Much smaller metapopulations occur in Kern County near Lost Hills, in the Kettleman Hills of Fresno and Kings counties, and in the Jacalitos Hills of Fresno County. Isolated occurrences are known from the Panoche Hills in Fresno and San Benito counties, near the city of Bakersfield, and the Cuyama Valley.

Potential threats to one or more sites or metapopulations of San Joaquin woolly-threads include commercial development, conversion of natural habitat to agriculture, increased petroleum

production, competition from nonnative plants and either complete removal or grazing or uncontrolled grazing.

Reasons for Decline and Threats to Survival: Population and plant size can vary depending on site and weather conditions. In years of below-average precipitation, few seeds of this species germinate, and those that do typically produce tiny plants. The California Native Plant Society has placed it on List 1B (rare or endangered throughout its range).

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Species Description and Life History: The southwestern willow flycatcher was listed as endangered on February 27, 1995 (60 FR 10693). Designated critical habitat for the southwestern willow flycatcher includes portions of the Santa Ana River (Riverside and San Bernardino Counties, California), Santa Margarita River, San Luis Rey River, San Diegito River, San Diego River, and Tijuana River, (San Diego County, California), South Fork Kern River (Kern County, California), San Pedro River (Cochise, Pima and Pinal Counties, Arizona), Verde River (Yavapai and Gila Counties, Arizona), Wet Beaver Creek and West Clear Creek (Yavapai County, Arizona), Colorado River (Coconino County, Arizona), Little Colorado River, and the West, East, and South Forks of the Little Colorado River (Apache County, Arizona), Gila River and the East and West Forks of the Gila River (Catron, Grant and Hidalgo Counties, New Mexico), and San Francisco River, Tularosa River and Apache Creek (Catron County, New Mexico)(50 CFR 17.95b).

The southwestern willow flycatcher is a small passerine bird measuring about 5.75 inches in length from the tip of the bill to the tip of the tail and weighing only 0.4 ounce. It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, the lower is light yellow grading to black at the tip.

Historic and Current Distribution: The southwestern willow flycatcher breeds in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico. Within this region, the species is restricted to dense riparian associations of willow, cottonwood, buttonbush and other deciduous shrubs and trees. It most likely winters in Mexico, Central America, and perhaps northern South America (Phillips 1948, Peterson 1990).

The historic range of southwestern willow flycatchers in California apparently included all lowland riparian areas in the southern third of the state. It was considered a common breeder where suitable habitat existed (Wheelock 1912, Willett 1912, 1933, Grinnel and Miller 1944). Current known flycatcher breeding sites are restricted to four counties, San Diego, Riverside, Santa Barbara and Kern. Combining survey data for all sites surveyed since the late 1980s for a composite population estimate, the total known southwestern willow flycatcher population in southern California is 114 territories. Of the 18 sites where flycatchers have been documented, 72 percent (13) contain five or fewer territorial flycatchers; 22 percent (four sites) have single

pairs or unmated territorial birds. Only three drainages are known to have 20 or more flycatcher territories, the San Luis Rey River (San Diego), South Fork Kern River (Kern) and Santa Ynez River (Santa Barbara).

Reason for Decline and Threats to Survival: The decline of the southwestern willow flycatcher is attributed to loss, fragmentation, and alteration of riparian habitat throughout its range for agriculture, flood control, navigation, and urban use. Current threats to the survival and recovery of southwestern willow flycatcher include the continued fragmentation and loss of the remaining riparian habitat, introduction of exotic plant species, livestock grazing in riparian habiat, and nest parasitism by brown-head cowbirds (*Molothrus ater*). The fragmentation and small size of individual populations make the species vulnerable to random natural events.

Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)

Species Description and Life History: The Tipton kangaroo rat was listed as endangered on July 8, 1988 (53 FR 25608). The Tipton kangaroo rat is included in the Upland Species Recovery Plan (USFWS 1998).

The Tipton kangaroo rat is one of three subspecies of the San Joaquin kangaroo rat. Although there is a slight difference in size (the Tipton kangaroo rat is larger than the Fresno kangaroo rat and smaller than the short-nosed kangaroo rat), the three subspecies are indistinguishable except through genetic analysis. See Fresno kangaroo rat for description of the species.

Tipton kangaroo rats eat mostly seeds, with small amounts of green, herbaceous vegetation and insects supplementing their diet when available. Burrow systems are usually in open areas but may occur in areas of thick scrub. They are typically simple, but may include interconnecting tunnels. Most are less than 10 inches deep. They are commonly in slightly elevated mounds, the berms of roads, canal embankments, railroad beds, and bases of shrubs and fences where wind-blown soils accumulate above the level of surrounding terrain. Terrain not subject to flooding is essential for permanent occupancy by Tipton kangaroo rats.

Historic and Current Distribution: The historical geographic range of Tipton kangaroo rats was over 1.7 million acres. Distribution was limited to arid-land communities occupying the valley floor of the Tulare Basin in level or nearly level terrain. By 1985, the inhabited area had been reduced, primarily by cultivation and urbanization, to about 60 thousand acres, only about 4 percent of the historical acreage. Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National Wildlife Refuge, Delano, and other scattered areas within Kern County. Genetic studies are ongoing at two populations in Kings County to determine whether they are Tipton or Fresno kangaroo rats.

Density estimates range from 2.8 to 3.6 animals per acre. Habitat type and climatic conditions appear to play a role in density. For example, at the end of a 5 year drought in April 1991, populations erupted, peaking in January 1993. In April 1995, following a higher than average rainfall year, the populations declined.

Reasons for Decline and Threats to Survival: The construction of dams and canals that made a dependable supply of water available and allowed the cultivation of the alkaline soils of the saltbush and valley sink scrub and relictual dune communities, was principally responsible for the decline and endangerment of the Tipton kangaroo rat. Widespread, unrestricted use of rodenticides to control California ground squirrels probably contributed to the decline or extirpation of small populations. Urban and industrial development and petroleum extraction all have contributed to habitat destruction. Except for small, isolated populations, predation is unlikely to threaten Tipton kangaroo rats. The increasing fragmentation of the range of Tipton kangaroo rats, however, increases the vulnerability of small populations to predation. Current threats of habitat destruction or modifications come primarily from industrial and agriculturally-related developments, cultivation and urbanization, and secondarily from flooding.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

Species Description and Life History: The valley elderberry longhorn beetle was listed as threatened on August 8, 1980 (45 FR 52803). Critical habitat was designated for the beetle in two areas in Sacramento County on May 7, 1980 (50 CFR 17.95i). The Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984) and Barr (1991) contains further details on the beetle's life history; references from these documents have not been repeated here. The valley elderberry longhorn beetle is a member of the family Cerambyidae and is characterized by a somewhat elongate, cylindrical body with long antennae, often more than 2/3 of the body length. Males range in length from about 0.5 to nearly 1 inch (measured from the front of the head to the end of the abdomen) with antennae about as long as their bodies. Females are slightly more robust than males, measuring about 0.75 to 1 inch, with somewhat shorter antennae. Beetles are dark metallic-green with a bright red-orange border on the elytra (thickened, hardened forewings). Males generally have the metallic-green elytral pattern reduced to four oblong spots, exhibiting much of the red-orange color. Females and some males are mostly metallic-green and exhibit only a narrow band of red-orange color along the front margin of the elytra, resembling the subspecies *D. c. californicus*. The red-orange border eventually fades to yellow on museum specimens.

The valley elderberry longhorn beetle is dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests of the Central Valley. Use of the plants by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just before the pupal stage. Recent field work along the Cosumnes River and in the Folsom Lake area suggests that larval galleries can be found in elderberry stems with no evidence of exit holes. The larvae either succumb before constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems that are 1.0 inch or greater in diameter at ground level.

Historic and Current Distribution: Historical distribution of the beetle is not known, but specimens were collected in the Sacramento River, Putah Creek, American River, Calaveras River, and Merced River. The riparian forest that supports this species once covered thousands

of acres in the Central Valley. The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. The beetle appears to be only locally common, i.e., found in population clusters that are not evenly distributed across available elderberry shrubs.

Reasons for Decline and Threats to Survival: Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development. Frayer *et al.* reported that approximately 85 percent of all wetland acreage in the Central Valley was lost before 1939; and that from 1939 to the mid-1980's, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland next to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat.

Very little is known about the beetle's life history and its ecological requirements, and precise threats to its survival are difficult to enumerate. The primary threat to survival of the beetle, however, continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, as well as recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas and along road right-of-ways may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a food plant for beetle may also be a factor in its limited distribution.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Species Description and Life History: The vernal pool fairy shrimp was listed as threatened on September 19, 1994 (59 FR 48136). Fairy shrimps are aquatic crustaceans in the order Anostraca. They have delicate elongate bodies, large stalked compound eyes, no carapaces, and 11 pairs of swimming legs. They glide gracefully upside down, swimming by beating their legs in a complex, wavelike movement that passes from front to back. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The resting or "summer" eggs are known as "cysts." They are capable of withstanding heat, cold and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. The cysts hatch when the pools fill with

rainwater. The early stages of the fairy shrimp develop rapidly into adults. These non-dormant populations often disappear early in the season long before the vernal pools dry up.

Vernal pool fairy shrimp inhabit pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. They have been collected from early December to early May.

Historic and Current Distribution: There are 32 known populations of the vernal pool fairy shrimp, extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to mainly agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply and flood control projects, and agriculture.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

The habitat of the listed vernal pool crustaceans is highly fragmented. This fragmentation results in small isolated populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987a,b). Should extinction occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to geographical isolation from other populations.

Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)

Species Description and Life History: The vernal pool tadpole shrimp was listed as endangered on September 19, 1994 (59 FR 48136). It has dorsal compound eyes, a large shield-like carapace that covers most of the body, and a pair of long cercopods at the end of the last abdominal segment. Tadpole shrimp climb or scramble over objects, as well as plowing along or within bottom sediments. Their diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates. This animal inhabits vernal pools containing clear to highly turbid water, ranging in size from 54 square feet to the 89-acre. The life history of the vernal

pool tadpole shrimp is linked to the phenology of the vernal pool habitat. After winter rainwater fills the pools, the populations are reestablished from diapaused cysts, which lie dormant in the dry pool sediments. Sexually mature adults have been observed in vernal pools three to four weeks after the pools had been filled. Some cysts hatch immediately and the rest enter diapause and remain in the soil to hatch during later rainy seasons.

Historic and Current Distribution: The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County.

Reasons for Decline and Threats to Survival: The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, but which has been converted to mainly agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply and flood control projects, and agriculture.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans.

The habitat of the listed vernal pool crustaceans is highly fragmented. This fragmentation results in small isolated populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987a,b). Should extinction occur in one population, the opportunities for recolonization are thought to be greatly reduced due to its geographical isolation from other populations.

Yosemite toad (*Bufo canorus*)

Description of Species: The Service was petitioned by the Center for Biological Diversity and the Pacific Rivers Council in February of 2000 to list the Yosemite toad as an endangered species. On October 19, 2000, the Service determined that listing of this species as endangered was warranted. The Yosemite toad occurs in the central high Sierra in wet meadows, and in seasonal ponds associated with lodgepole pine and subalpine conifer forests. Quiet pools in alpine meadows provide optimal habitat. *B. canorus* feeds on beetles, ants, mosquitoes, dragonfly nymphs, centipedes, and spiders (Grinnell and Storer 1924; Mullally 1953).

Historic and Current Range: This species range includes the vicinity of Grass Lake, El Dorado County, south of Kaiser Pass and Evolution Lake, Fresno County.

Reason for Decline and Threats to Survival: Cattle grazing has had serious effects on various amphibian species including the Yosemite toad. Long-term grazing has had an impact on the recruitment and age structure of Yosemite toad populations. Grazing cattle can also trample breeding ponds and juvenile toads in the meadows, destroy riparian vegetation (which is used as protective cover for adult amphibians), and erode stream banks. Toad populations may fail to reproduce as a result of poor water quality, a potential product of cattle defecation in breeding ponds. In highly impacted areas, successful reproduction is often prevented due to poor health of adult toads. Other factors affecting *B. canorus* include the introduction of trout and bullfrogs, and pesticide drift from agricultural lands in the Central Valley.

Environmental Baseline

This section contains an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species and their habitats addressed in this biological opinion within the action area of the proposed project. The environmental baseline is organized by habitat type below. Species for which the baseline has not significantly changed from the programmatic consultation for implementation of CVPLA are not specifically mentioned below. The effects of the proposed project are addressed in a separate section and are not included here.

Federal, State, local, and private actions already affect the species addressed in this opinion within the action area. These actions include gas and oilfield development and pipeline installation, utility upgrades, power plant and transmission line construction, landfill operations, wastewater treatment operations, road construction and widening, sand dredging, agricultural activities subsidized by Federal money, and residential development. The Valley Recovery Plan discusses numerous Federal, State, and private individual or collaborative community-level conservation efforts. The majority of listed wildlife and plants in the action area have been, and continue to be affected by conversion of habitat to agricultural, industrial, and urban uses. This has eliminated many listed species from the majority of their historic ranges. The remaining natural communities are highly fragmented; many are marginal habitats in which some listed species may not persist during catastrophic events such as drought or floods (Service 1998).

This region today is a landscape dominated by human activities including farming, oil and mineral exploration and extraction, urban development, pesticide applications, off-road vehicle use, and construction of transportation, communications, and irrigation infrastructures. For example, less than 150,000 acres on the Valley floor remains uncultivated, and most of the remaining undeveloped land is in the foothills in the Valley perimeter. Significant portions of the land not cultivated or urbanized have been developed for petroleum extraction, strip-mined for gypsum and clay, or occupied by roads, canals, airstrips, oil-storage facilities, pipelines, and evaporation and percolation basins. In addition, natural communities have been permanently altered by the introduction and proliferation of non-native plants, which now dominate many remaining natural habitats (Service 1998).

In previous Opinions the Service has tasked the Bureau of Reclamation with providing baseline information on species in the San Joaquin Valley. While Reclamation has started on this task, it

has not been able to accomplish the task in a timely manner. Therefore, the baseline information available here is fragmentary and incomplete.

Human activities can be linked to subsidized imported water and population growth in the San Joaquin Valley. Completion of state and Federal water projects, as already described, has resulted in rapid cultivation and irrigation of wild lands along the east side of the San Joaquin Valley (Service 1998). Population growth is occurring, in part because of the availability of water. For instance, the population of Kern County is expected to double between 1987 and 2010, from 286,000 people to 567,500 people. This population will occupy an additional 34,000 acres for houses and 10,500 acres for commercial and industrial uses (City of Bakersfield 1990). Consequently, the pressure to develop remaining wild land parcels will grow, in Kern County, and in other population centers in the Valley.

Comparing GIS data layers, the Service analysed trends in land uses in three regions that encompass the Friant Division and Cross Valley Unit service areas - the East San Joaquin Basin, the West Tulare Basin, and the East Tulare Basin (See Figure 3.1). Data from Kuckler estimating habitat from historic times was compared to Weislander habitat estimates (1935-1945 period), and also compared to GAP analysis data from 1991. Weislander did not estimate wetland and aquatic habitats.

Table 3.1. Estimated changes in acres of habitat over time in the eastern San Joaquin Basin by habitat type.

Habitat Type	Historic Times (Kuckler)	1935-1945 (Weislander)	1991 (GAP Analysis)
Conifer	767,539	876,520	483,776
Montane Hardwood Conifer	282,649	0	0
Cismontane Woodlands	1,974,633	1,427,026	1,494,495
Riparian	288,551	0	18,576
Shrub-scrub	92,792	0	1,970
Chapparral	142,535	315,643	215,812
Grassland	2,451,295	1,318,560	915,802
Natural Wetlands	217,221		11,610
Aquatic Habitats			49,707
Developed Lands		1,996,818	2,447,553
Barren Lands			10,243
Totals	5,934,566	5,934,567	5,932,193

Table 3.2. Estimated changes in acres of habitat over time in the western Tulare Basin by habitat type.

Habitat Type	Historic Times (Kuckler)	1935-1945 (Weislander)	1991 (GAP Analysis)
Conifer	16,755	14,561	23,167
Pinyon-Juniper	19,327	62,271	70,706
Montane Hardwood Conifer	0	6,697	0
Cismontane Woodlands	272,826	99,556	24,577
Riparian	0	0	24,135
Shrub-scrub	1,175,278	579,907	398,347
Chapparral	60,997	0	21,241
Grassland	950,906	1,339,002	570,209
Natural Wetlands	505,306		4,099
Aquatic Habitats			7,594
Developed Lands		825,598	1,854,569
Barren Lands		634	2,422
Totals	3,001,395	2,928,226	3,001,066

Table 3.3. Estimated changes in acres of habitat over time in the eastern Tulare Basin by habitat type.

Habitat Type	Historic Times (Kuckler)	1935-1945 (Weislander)	1991 (GAP Analysis)
Conifer	439,844	399,210	306,309
Pinyon-Juniper	98,961	100,865	72,920
Montane Hardwood Conifer	0	0	153,335
Cismontane Woodlands	1,219,125	874,735	1,024,504
Riparian	48,123	0	12,642
Shrub-scrub	1,818	130,493	86,416
Chapparral	318,181	330,265	144,242
Grassland	1,192,449	771,020	528,289
Natural Wetlands			1,179
Aquatic Habitats	13,706		13,520
Developed Lands		725,619	975,418
Barren Lands			11,057
Totals	3,332,207	3,332,207	3,329,831

Vernal Pools

Vernal pools are ephemeral wetlands that typically form in shallow depressions underlain by a substrate near the surface that restricts the percolation of water. These depressions fill with rainwater and runoff from adjacent areas during the winter and may remain inundated until spring or early summer, sometimes filling and emptying more than once during the wet season. Vernal pools are frequently clustered into assemblages known as vernal pool complexes. Individual pools within a vernal pool complex are mutually interdependent in supporting listed vernal pool species; when a species is extirpated from an individual pool, other pools in the complex may serve as recolonization sources. Upland habitat and swales around and within a vernal pool complex are essential to the hydrological and biological integrity of the complex. Vernal pools are habitat to numerous animal and plant species, including many that are obligate species.

Using aerial and satellite imagery, Holland (1997) mapped the remaining vernal pool habitat in the Central Valley in 1997, and calculated habitat loss by County since previous mapping efforts (Table 3.4). Holland estimated that there are less than 1,000,000 acres of vernal pool habitat remaining in the Central Valley, a 75 percent loss since pre-agricultural times. In September 1999, U.S. Fish and Wildlife Service Biologist Chris Davis at the Sacramento Office expanded upon Hollands efforts to summarized habitat loss since 1997 in the five counties that receive Friant and Cross Valley water. These losses are summarized below.

Table 3.4. Loss of vernal pool habitat as calculated by Holland (1997) and Davis (1999).

County	Vernal Pool ¹ Grasslands (acres) (year)	Vernal Pool ¹ Grassland- 1997 (acres)	Known Habitat Lost ² since 1997 (acres/# sites)	Percent Loss since [Year]
Fresno	27,995 (1994)	27,459	200/1	2% since 1994
Kern	7,399 (1990)	6,848	1,325/5	10% since 1990
Madera	91,178 (1987)	87,047	5,040/5	10% since 1987
Merced	282,741 (1987)	252,424	3,180/3	12% since 1987
Tulare	36,907 (1993)	34,900	75/2	6% since 1993
Total	> 446,180 (1987)	408,678	9,820/15	>10.6% since 1987 2.5% since 1997

¹ Holland 1998.

² Davis 1990. Includes sites that support endangered species habitat that were not mapped by Holland (1998) as "vernal pool grasslands".

This rapid destruction and degradation of vernal pool habitat have put many obligate vernal pools species on the Federal Endangered Species Act. Listed species endemic to vernal pools found in the Friant and Cross Valley Division Service Areas include: Colusa grass, Conservancy fairy shrimp, fleshy owl's-clover, hairy Orcutt grass, Hoover's spurge, longhorn fairy shrimp, San Joaquin Valley Orcutt grass, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

It is uncertain how much vernal pool habitat have been protected, created, or restored. In 1999, the Sacramento Office reviewed all section 7 consultation dealing with vernal pool fairy shrimp and tadpole fairy shrimp since its listing in 1994, in response to a petition for delisting (Service 1999). The review determined that for 48,202 acres of habitat (including uplands) that were developed, 300 acres of vernal pools were created or restored, and 563 acres were protected in perpetuity. These protected, created, or restored pools represent one percent of the remaining vernal pool habitats, and are distributed in more than 14,500 acres of conservation lands scattered throughout the Central Valley. However, the San Joaquin Valley represents only a small area of preserved lands.

Grassland and Scrub Habitats

The species that inhabit grassland and scrub habitats, or use these habitats in part of their life cycle that are addressed in this opinion include: California jewelflower, palmate-bracted bird's-beak, Hoover's woolly-star (Hoover's eriastrum), San Joaquin woolly threads, Bakersfield cactus, Giant kangaroo rat, Fresno kangaroo rat, Tipton kangaroo rat, blunt-nosed leopard lizard, San Joaquin kit fox, Buena Vista Lake shrew, mountain plover, and the California condor.

A comparison of the 1991 GAP Analysis data to the estimates of historic habitat coverage, presented above, shows that approximately 40% of grassland and scrub habitat remain in the three basins which include the Friant and Cross Valley Service Areas. Grasslands are defined as habitats dominated by perennial or annual grasses, and scrub communities are defined as habitats dominated by shrubs that are less than 2 feet tall. In the San Joaquin Valley, scrub habitats occur in alkali sinks, on alluvial fans, on dune remnants, and in arid uplands.

The following sections describe the status of the species that occur in grasslands and scrub habitats for some or all of their life cycle.

California Jewelflower

Habitat loss resulting from agricultural land conversion, increased livestock grazing and trampling associated with the development of summer water sources, oil and gas development, other human activities, and competition with aggressive non-native annual grasses probably eliminated California jewelflower from Fresno, Kings, and Tulare Counties and reduced its range in Kern and Santa Barbara Counties. These factors continue to threaten many of the remaining populations (Taylor and Davilla 1986; Service 1990).

Palmate-bracted Bird's-beak

As a result of intensive survey efforts and additional introductions, palmate-bracted bird's-beak now is known to occur in seven metapopulations; five north of the Friant and Cross Valley Districts, and two in the San Joaquin Valley. The populations in the San Joaquin Valley are within 10 miles of the Fresno Irrigation District. Changes in the hydrologic regime by drainage, diking, and channelization have interrupted the seasonal overland flows and altered water salinity near the populations closest to the Fresno Irrigation District (Service 1998). The number of populations has been shrinking, and the numbers of plants extant in each population has also been shrinking. Of nine historical populations only two were known to still exist in 1985 (50 FR 28870).

Hoover's Woolly-star (Hoover's Eriastrum)

Valley floor populations of Hoover's eriastrum have been destroyed primarily by farming operations and secondarily by urban development. In 1986, an estimated 92 percent of the known extant populations of Hoover's eriastrum were threatened by future conversions to

agricultural use, groundwater recharge basins, and oil and gas development (Taylor and Davilla 1986). Hoover's eriastrum exists on some remnants of native habitat in the Valley portion of Kern County. Although some sites contain substantial populations (5,000-40,000 individuals), most of the remaining sites on the valley floor are at risk because they are isolated from one another, range in size from approximately 1 acre to less than 400 acres, and contain fewer than 1,000 individuals (55 FR 29361). Conversion of land from native habitat or grazing to row crops continues to threaten Hoover's eriastrum populations in Kern County (Service 1998).

San Joaquin Woolly-threads

San Joaquin woolly-threads exists on some remnants of native habitat and grasslands. Valley floor populations of San Joaquin woolly-threads have been destroyed primarily by farming operations and secondarily by urban development. Occurrences of the plant in the Bakersfield metropolitan area have mostly been extirpated, and the rest are threatened by development. Conversion of land from native habitat or grazing to row crops continues to threaten San Joaquin woolly-threads populations (Service 1998).

Bakersfield Cactus

Bakersfield cactus occurs in grassland on bluffs, low hills, toe slopes, drainages, and flats. It prefers substrates of coarse cobble and well-drained sand. Most of the remaining Bakersfield cactus occurs to the north and east of downtown Bakersfield, or south of the proposed project action area near the intersection of Interstate 5 and State Route 99. Substantial decline has resulted from urbanization, agricultural conversion (primarily for citrus groves and row crops), oilfield development, overgrazing, dumping, sand mining, and invasion of weedy grasses (CDFG 1992). These activities plus off road vehicle (ORV) use, telecommunication and electrical line construction, and proposed flood control basins continue to threaten the remaining sites (Service 1990). Agricultural conversion remains the most pervasive threat to this species.

San Joaquin Kit Fox

Loss and degradation of habitat by agricultural, industrial, and urban developments and associated practices continue to affect San Joaquin kit foxes. Loss of habitat contributes to San Joaquin kit fox declines through displacement, direct and indirect mortalities, barriers to movement, and reduction of prey. The isolation of remaining habitat fragments coupled with habitat degradation and barriers to movement, such as aqueducts and busy highways, limits dispersal and threaten survival of San Joaquin kit fox populations (Service 1998).

Natural lands along the edges and within the San Joaquin Valley are considered suitable habitat for San Joaquin kit foxes. Kit foxes can also forage and den on rangeland; other types of cropland have little to no value for kit fox. Satellite populations essential for recovery of the species are found in Friant and Cross Canal Water Contractors districts in Merced and Madera Counties, and in Tulare and Kern Counties. North-south linkages between these populations are essential.

San Joaquin kit fox population trends are downward throughout the species' range (Asserson and Williams 1999, personal communications). Detailed studies of the western Kern County population have recently been conducted. Population monitoring of San Joaquin kit fox at the former Naval Petroleum Reserve on the west side of Kern County indicated a general downward trend in foxes captured from 1981 to 1996, as shown in Table 4.5. EG&G Energy Measurements Group, which was under contract to the U.S. Department of Energy, captured more than 50 individual foxes per year in 1981, 1982, and 1994. Thirty-three foxes were captured in 1995, and 24 foxes were captured in 1996. Reasons for the decline are not fully understood and are probably complex. The decrease in fox captures from 1995 to 1996 may be caused in part by a decrease in the abundance of kangaroo rats, other rodents, and lagomorph prey species, possibly depressing overall reproductive success and survival (Otten and Cypher 1997).

CDFG biologists regularly conduct nighttime spotlight surveys for kit foxes along a route that includes portions of State Route 58. The biologists frequently observe kit foxes along this route. Survey results from the route indicate a decline in kit fox numbers over the last several years. In other areas of Kern and San Luis Obispo Counties, occurrences of San Joaquin kit fox are more fragmented. Some San Joaquin kit foxes have managed to find foraging and denning habitat within the City of Bakersfield, especially along the Kern River.

Giant Kangaroo Rat

The decline of giant kangaroo rats is attributed primarily to habitat loss from the conversion of native scrub and grasslands to agriculture (Service 1998). An estimated 1.8 percent of the giant kangaroo rat's historical habitat remains (Williams 1992). Populations within remaining habitat fluctuate widely in response to changing weather patterns (Williams 1992, Service 1998a). Since listing as endangered, conversion of habitat for giant kangaroo rats has slowed substantially, because most tillable land has already been brought into cultivation, and because of a lack of water for additional irrigated acres. However, during and following the 1994-1995 winter, biologists noted a decline in abundance of kangaroo rats in the southern San Joaquin Valley. Decreased sign of activity and lower than expected trapping results were observed at several dispersed sites. Dramatic declines were noted for short-nosed, Tipton, and Heermann's kangaroo rats, although only modest reductions were noted for giant kangaroo rat populations on the valley floor (Single et al. 1996).

Urban and industrial developments, petroleum and mineral exploration and extraction, new energy and water conveyance facilities, and construction of communication and transportation infrastructures continue to destroy habitat for giant kangaroo rats and increase the threats to the species by reducing and further fragmenting populations. Rodent control programs have also contributed to the species' decline. Habitat degradation due to lack of appropriate habitat management on conservation lands, especially lack of grazing or fire to control density of vegetation (including shrubs) may be an additional threat to giant kangaroo rats (Williams and Germano 1993). Though many recent and future habitat losses will be mitigated for by protecting habitat elsewhere, they still result in additional loss and fragmentation of habitat. The BLM, in cooperation with species experts, has initiated giant kangaroo rat population monitoring studies on the west side of the Valley. There have been significant declines in giant

kangaroo rat numbers on BLM lands in response to both drought and above average rainfall conditions. While these fluctuations have been drastic in nature, the giant kangaroo rats have rebounded from low population numbers following the drought. Since the 1993 rebound, numbers have declined to various levels. Wildfire and prescribed burn monitoring has indicated that this species responds positively to fire (Germano and Saslaw, 1999, unpublished data). The decline in kangaroo rat abundance and distribution has been well documented in the southern San Joaquin Valley (Single et al. 1996).

Table 3.5. San Joaquin kit fox captures from 1981 to 1996 on the Naval Petroleum Reserve Study Area, Kern County, California.

Year	Trap Nights	Captures	Individuals
1981	711	209	141
1982	710	117	87
1983	712	17	17
1984	711	51	42
1985	708	31	26
1986	712	25	22
1987	712	27	23
1988	712	27	23
1989	712	27	26
1990	712	28	18
1991	712	2	2
1992	712	20	16
1993	712	50	40
1994	712	80	61
1995	712	40	33
1996	706	34	24

Source: Department of Energy 1998

Tipton Kangaroo Rat

The causes of decline of the Tipton kangaroo rat are similar to those discussed above for the giant kangaroo rat. Conversion of native habitats to agricultural production is considered the primary reason for the Tipton kangaroo rat's population decline (53FR25608). Construction of canals, roads, highways, railroads, and buildings and the use of rodenticides have probably also accelerated this subspecies' population decline. Because of the small, isolated nature of many

remaining populations, their lack of genetic diversity, and low powers of dispersal, Tipton kangaroo rats are especially vulnerable to local extirpation from random environmental events such as flooding or unpredictable land use changes.

Fresno Kangaroo Rat

The Fresno kangaroo rat is near extinction, with loss of habitat to cultivation and year-round grazing (which typically requires supplemental feeding) the major threats to the species' survival (Service 1998). Flooding poses a high risk to protected habitat in Fresno County. Possible existing populations are within the Chowchilla Water District and Fresno Irrigation District.

California Condor

California condors roost and nest in higher elevation areas on cliffs, and forage across hilly lower elevation areas. They are known to forage up to 100 miles from their roosts. Condors from San Luis Obispo and Santa Barbara Counties have been seen in Taft in Kern County, at the edge of the coastal mountains (Mitchell 1998 personal communication), and have flown as far as Bishop from Ventura County. The birds which were reintroduced in Santa Barbara and San Luis Obispo Counties forage in the foothills and on the valley floor west of Interstate 5 in western Kern County and along the Tehachapi foothills in southern Kern County. Foraging habitat for the California condor has been lost to row crops, oil development, urban development, and (Service 1998b).

Recent releases of captive-reared condors in Ventura, Santa Barbara and San Luis Obispo Counties have increased the possibility that these birds may encounter construction operations and maintenance activities or transmission lines in foraging habitat in the vicinity of this project. A new release of 6 condors occurred in 1999 in northwestern Santa Barbara County, near the edge of the San Joaquin Valley. Should condors become established in coastal California, it is likely they would fly over the entire southern San Joaquin Valley. Although condors bred in the wild were not known to forage on the valley floor, the animals bred in captivity tend to be more opportunistic and may feed there (Robert Mesta 1998 personal communication).

Blunt-nosed Leopard Lizard

Blunt-nosed leopard lizards currently occupy scattered parcels of undeveloped land on the Valley floor, and occurs in the foothills of the Coast Range. While the blunt-nosed leopard lizard can occupy grassland used for grazing it prefers lands with scattered shrubs and sparse grass/forb cover. Habitat for the blunt-nosed leopard lizard has been lost or degraded due to row crops, pesticide application, oil development, urban development, and off-road vehicle use (Service 1998).

Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Disturbances and modifications of habitats within areas of mineral

and petroleum development pose lesser, but continuing threats as they degrade the habitat. Direct mortality occurs when animals are killed in their burrows during construction, killed by vehicle traffic, drowned in oil, or fall into excavated areas from which they are unable to escape. Displaced lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization.

Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by lizards for shelter. Unlike cultivation of row crops, which precludes use by leopard lizards, light or moderate grazing may be beneficial. The use of pesticides may directly and indirectly affect blunt-nosed leopard lizards. The insecticide Malathion has been used since 1969 to control the beet leafhopper, and its use may reduce insect prey populations. Fumigants such as methyl bromide are used to control ground squirrels. Because leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned.

In recent years, above average precipitation seems to have increased the amount of vegetative cover. This increase in cover may be a factor in the low abundance of adult lizards seen during population monitoring in western Kern County in 1995 (U.S. Department of Energy and Chevron 1996). The Pixley-Allensworth within the Friant Division area is one of several areas given highest priority for habitat protection for the blunt-nosed leopard lizard (Service 1998).

Suitable habitat for the blunt-nosed leopard lizard is available in annual grassland and saltbush scrub habitats in the Friant Division and Cross Valley Division areas. At a study area in Kern County, a decline in leopard lizard numbers has been observed in recent years (David Germano personal communication 1998).

Mountain Plover

Conversion of grassland habitat, agricultural practices, the management of domestic livestock, decline of native herbivores, and pesticides are factors that likely have contributed to the mountain plover's decline. Pesticides are applied to cultivated fields during the 5 months that mountain plovers occupy their winter habitat in California (Knopf 1996b).

The 1998 California Bird Census found 2179 mountain plovers in 10 California counties, including Imperial, Kings, Los Angeles, Monterey, Riverside, San Benito, San Luis Obispo, San Bernardino, Solano, and Yolo Counties (Hunting, in litt., 1998). While mountain plovers were not counted in Kern County, they were seen in surrounding counties, and they are likely to be present in western Kern County.

Riparian Habitat

Listed, proposed and candidate species that inhabit riparian habitat include: Buena Vista lake shrew, giant garter snake, least Bell's vireo, riparian brush rabbit, riparian woodrat, southwest willow flycatcher, and valley elderberry longhorn beetle. Much of the historical riparian habitat along San Joaquin River has been lost due to water diversions associated with CVP, agricultural and residential encroachment. Except for water required to satisfy downstream riparian rights, most water from the Friant dam is diverted for agricultural, municipal, and industrial use. In fact, the reach of river between Friant Dam and Gravelly Ford dried up intermittently. In the mid-1980's, it was estimated that only 5.8 percent of riparian habitat along the San Joaquin remained. The acreage is likely to be much less today (Service 1998).

Buena Vista Lake Shrew

Buena Vista Lake shrews are only verified in two localities, on the privately owned Kern Lake Preserve that consists of only 10 individuals as of 1995, and in Kern National Wildlife Refuge. Kern Lake Preserve was cooperatively by The Nature Conservancy until the early 1995, when negotiations for a cooperative management agreement failed (Service 1998b). Ornate shrews were founds at a couple of other privately owned sites, but they could not be identified to subspecies. The primary cause of decline is the loss and fragmentation of habitat due to diversion of water from the former Kern, Tulare, and Buena Vista lake bed for farming purposes (65 FR 35033). The extremely restricted distribution and abundance of the species is a major threat to its survival.

Giant Garter Snake

Endemic to wetlands in the Sacramento and San Joaquin valleys, the giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields. Giant garter snakes are typically absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1980, Rossman and Stewart 1987, Brode 1988, Hansen 1988). Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1980).

The giant garter snake currently is only known from a small number of populations. The status of these populations and the threats to these snakes and their habitats are detailed in the final rule that listed the giant garter snake as threatened (58 FR 54053) and the draft recovery plan (Service 1999).

Least Bell's Vireo

The least Bell's vireo has been seen in Kern County in recent years, but more information is needed about their status. Least Bell's vireos primarily inhabit dense, willow-dominated riparian habitats with lush understory vegetation. Most riparian habitat in Kern County has been eliminated due to water diversions for agriculture, industry, and urban uses.

Riparian Brush Rabbit and Riparian Woodrat

The riparian brush rabbit is currently restricted to a single population at Caswell Memorial State Park, San Joaquin County, along the Stanislaus River (Williams and Basey 1986). The riparian brush rabbit is also restricted to Caswell Memorial State Park, with a possible second population near Vernalis, San Joaquin County. Williams (1993) estimated a peak population at Caswell of 437 animals, based on mean density of 4.8 woodrats per ha on 223 acres of suitable habitat. Surveys conducted in all potential habitat along the Merced, San Joaquin, Stanislaus and Tuolumne rivers during 1985 and 1986 failed to find any additional populations of riparian brush rabbits (Williams 1988). Recent peak population estimates are from 88 to 452 individuals (Williams 1988), 320 to 540 individuals (Basey 1990), and 170-608 individuals over 198 acres (Williams 1993). Williams (1988) estimated a population low of 10 or fewer individuals following severe winter flooding in 1985-86. The flooding during the winter of 1996-7 has also severely affected the population. In recent years, ESRP has been working with Reclamation to recover these imperiled species. An ongoing project involves establishing an experimental population of riparian brush rabbits along Kings River in Fresno County, outside its historical range. Other recovery efforts by ESRP, Reclamation, and Friant Water Users are summarized in Appendix C.

Southwestern Willow Flycatcher

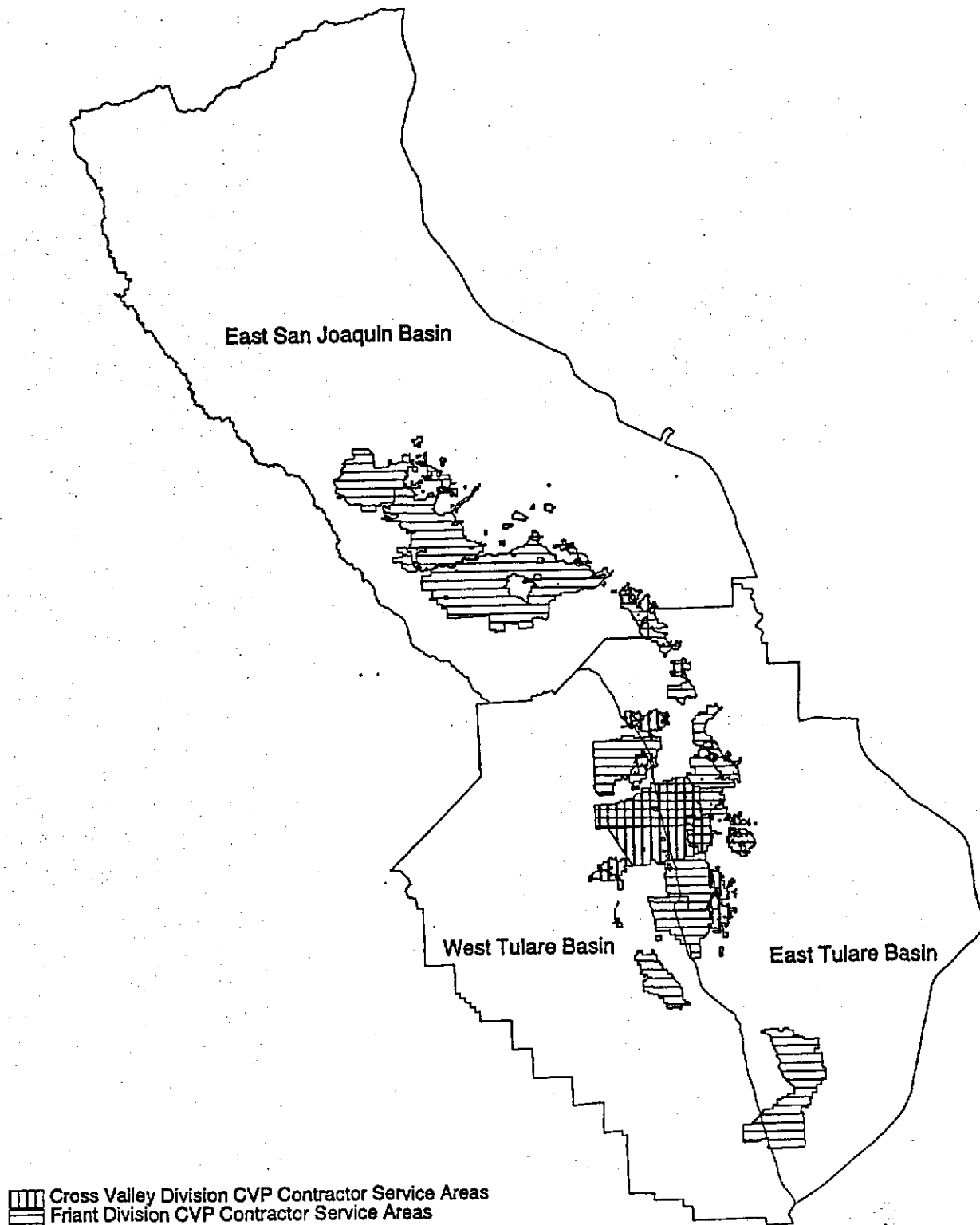
The southwestern willow flycatcher historically occupies dense riparian associations of willow, cottonwood, buttonbush and other deciduous shrubs and trees in the southern third of the State. It has been extirpated over much of its historical range. Current habitat in the vicinity of the Friant and Cross Valley service area include the south fork of the Kern River. The species is threatened by its small breeding population, patchy distribution, loss of riparian habitat and parasitism by cowbirds.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is patchily distributed throughout the Central Valley from Redding to Bakersfield area. In the summer of 1991, the Service conducted a survey of 230 sites through its range. No individuals were found along the Merced River and along the San Joaquin River upstream of the confluence of Merced. Several sites were found along Kaweah and Kings Rivers in Tulare County, and along Kern River (Service 1991).

Figure 3.1

Association of Friant and Cross Valley Division Service Areas to Basins of the Central Valley



4. Effects of the Proposed Action and Cumulative Effects

This biological opinion analyzes the reasonably foreseeable effects of implementation of the proposed long-term water contracts over a period of 25 years, from the year 2001 through 2025. Implementation of the contracts or water deliveries beyond 25 years are not covered in this consultation. Below, we divide the effects of the water contracts into (1) effects of continuing delivery of water and its application for *existing* uses, and (2) effects of Federal water on water availability and conversion of listed species habitat to non-habitat after the Friant biological opinion of 1991.

Some actions related to the proposed action are not considered in this opinion. Certain related actions are identified in the November 21, 2000, program-level long-term contracts consultation (Service file #1-1-98-F-0124) as requiring section 7 consultation separate from the present opinion. These related actions include but may not be limited to: operations and maintenance activities undertaken for Reclamation by Friant water users; water transfers, assignments, and exchanges by Friant and Cross-Valley contractors, including flood flows (215 water), and Warren Act contracts for conveyance of non-federal water using federal facilities. Reclamation should consider whether it may have a duty to avoid irreversible or irretrievable commitments toward related actions subsequent to the initiation of the present consultation and before any biological opinion is completed for a related action. The incidental take statement accompanying this biological opinion will not authorize any incidental take of listed species resulting from related actions that are not considered and analyzed in this document.

Assumptions. In any 25-year extrapolation on the scale of the current consultation, a number of assumptions have to be made. This subsection, while not exhaustive, lays out some of the assumptions we have made in order to complete this effects analysis. Failure to meet any of these assumptions may be grounds for re-initiation of this consultation.

1. We assume the proposed action will be implemented in all particulars as described in the Description of the Proposed Action section, above, and any documentation referenced in that section, such as appendices or attached documents.
2. We assume the term of the contracts will be 25 years, and that Reclamation will consult under section 7 of the Act on any subsequent renewal of the contracts with full authority to revise the contracts as may be necessary at that time.
3. We assume Reclamation will initiate, provide adequate information for, and complete consultations on actions interrelated with this consultation, including but not limited to Friant and Cross-Valley operations and maintenance, exchanges, assignments, transfers, conveyance, and management of flood waters (215 water, etc.).
4. We assume delivery of full contract quantities is unrealistic and that deliveries will continue

to be impacted by existing climate, hydrology; actions and statutes including, but not limited to existing biological opinions (i.e., 1995 OCAP), existing implementation of the CVPIA, and conformance and adherence to additional existing State and Federal regulations and guidelines; and socio-economic factors. This effects analysis is conducted under the expectation that water will be delivered to CVP service contractors in quantities that approximate historic deliveries (1988 through 1997), as given in Appendix D of the November 21, 2000 programmatic long-term CVP contracts consultation. We assume that Reclamation and the Service will coordinate when the quantity of water to be delivered to the contractors exceeds the *average historical deliveries* provided in the programmatic consultation's Appendix D. We assume that, if deliveries are to be provided in excess of the *maximum historic deliveries* identified in that Appendix D, Reclamation will determine if these deliveries may affect listed or proposed species and/or critical habitat, and will include the Service in that determination.

5. The analysis for this opinion is based on the assumption that CVP water contract amounts and deliveries will remain consistent with those provided and analyzed in the Final PEIS for CVPIA. We assume Reclamation will initiate formal consultation under section 7 of the ESA on any infrastructure modifications or other actions which result in modification of the current delivery regime to Friant and Cross Valley contractors, and may affect federally listed species and/or their critical habitat.

Existing uses. For over five decades Reclamation has been diverting water from the San Joaquin River and delivering contract water to Friant and Cross Valley users. This water is applied to municipal and industrial uses, row crops, orchards, vineyards, irrigated pasture, and various other agricultural uses. It is the Service's understanding that the proposed contracts would provide unchanged amounts of water to the contractors (see Assumptions, above). We anticipate that continued application of Federal water to existing uses, without alteration of use, will not result in additional direct effects to listed species beyond those past effects described in the Environmental Baseline section, above. However, some conversion between different agricultural uses receiving unchanged deliveries of contract water could result in impacts, or benefits, to listed species. For example, some row crops have low habitat value for kit fox, while orchards can have higher values. Conversion of orchards to row crops may adversely affect kit foxes without triggering Reclamation or District review. In the absence of opportunity to evaluate trends in land uses in the contract areas, we assume that uses on lands already converted to agriculture as of this date within the districts will remain on average the same over the duration of this consultation.

The effect of continuing water diversions from the San Joaquin River in relation to the environmental baseline is complex. The baseline for Sacramento splittail, for example, is that habitat conditions have historically been greatly reduced above the junction with the Merced River, and continue to be so. In the absence of the proposed contracts, however, it is reasonable to expect that San Joaquin River flows would substantially increase and that habitat condition would improve to the point of allowing use by splittail, resulting in an increasing baseline. Thus a project/no project comparison indicates that splittail are adversely affected by the proposed

contracts. However, we do not anticipate that continued diversions would directly result in further incremental declines in the species baseline.

Habitat conversion. A substantial threat to listed species populations remaining in the Friant and Cross-Valley areas is continued conversion of useful habitats, to non-habitat or less useful habitats. Habitat conversions may in many cases occur as a result of, or be related to, federal water deliveries, since water supplies are limited and water is needed for agricultural and municipal and industrial developments in the semi-arid southern Central Valley. Although approximately 92 percent of the Friant and Cross-Valley service areas is currently in row crops, orchards, urban development, or other developed uses, areas with important habitat values remain, both within and near the service areas (Appendix GIS). Table 4.1 summarizes acreages with various habitat values within the proposed contract areas. We discuss these numbers with the understanding that some may be out of date; however the data are within the period covered by commitments for previous biological opinions (see Description of the Proposed Action, above).

Within the district boundaries only certain lands are classified as eligible to receive Reclamation water at the agricultural rate, or "irrigable". Irrigable lands make up 83 percent of Friant Division districts and 77 percent of Cross Valley districts. Any lands in the service areas may receive municipal & industrial rate water. We do not currently have information to distinguish the location of useful listed species habitats relative to irrigable versus non-irrigable lands.

According to the habitat data provided by Reclamation, there are or have recently been about 47,000 acres of rangeland within Friant Division service areas, or about 4.3 percent of the total Friant Division area. Similarly, there are about 25,000 acres of rangeland within Cross-Valley service areas, or about 10 percent of the total Cross Valley area. Conversions of rangeland or pastureland to row crops cause loss of habitable area and important habitat functions: for example, for kit foxes, and in many cases may result in direct mortality to foxes or pups. Other listed species may be similarly affected.

Vernal pools in California are also associated with grasslands/rangelands in the Central Valley, where extensive agricultural and urban lands have been developed. A portion of the 72,000 acres of rangeland within the districts' boundaries supports vernal pools with habitat for listed species. "Nonforested wetlands" in the GIS analysis probably also support some vernal pool habitats, including alkali sink vernal pools. Urban development is increasing in the southern Central Valley lower elevations where vernal pool grasslands and other listed species, including inhabitants of uplands, are found. More than a dozen listed species in this biological opinion are found in vernal pool habitats. It is estimated that more than 75 percent of vernal pools have been lost in the Central Valley. The proposed action of providing water to Friant and Cross Valley Divisions service areas may adversely impact vernal pool species by (1) degrading habitat or converting habitat to non-habitat, (2) isolating individual vernal pools from their complex, and (3) degradation of vernal pools through activities in surrounding uplands. These and other effects are discussed below

Table 4.1 Acreage of Land Uses, by District, in Friant and Cross-Valley Divisions

[illegible][illegible]

Continued agricultural and urban development in the affected area enabled by the delivery of Federal water may directly injure or kill listed species by filling or destroying remaining vernal pools. Habitat loss due to agricultural practices may occur at several levels, ranging from cattle grazing to orchard production. Cattle grazing, shallowing discing and ditching would degrade vernal pool habitat, however, these areas may be restored and recovered to previous hydrological conditions. Deep-ripping of habitat associated with orchard production or row crops, however, disturb the impervious substrate, and may represent an irreversible conversion.

As detailed in the Project Description, Reclamation and the Districts have proposed measures to minimize the conversion of habitats of listed species. We anticipate that these commitments will, among other things, restrict the delivery of Federal water that might allow conversion of remaining listed species habitats within the Districts, and restrict the annexation to the Districts of lands converted at least since 1995. Habitat conversions not in the purview of the Districts or Reclamation are addressed in the subsection below titled "Habitat conversions not addressed in the Project Description."

Habitat conversions not addressed in the Project Description. Certain habitat conversions likely to occur in the project vicinity appear to be outside the control of Reclamation or the contractors. Conversions inside the contract service areas that use groundwater and are not directly supplied with Federal water could continue unabated. Likewise, conversions outside the Districts that use groundwater and are within the zone materially affected by recharge from Federal water applications could continue, and are interrelated with the proposed contract deliveries. There may also be some use of tail-waters flowing off areas supplied by Federal deliveries, both in and below the contract service areas. Such interrelated but uncontrolled conversions are supported by the Federal action because they rely on groundwater recharge by Federal water. Even if the actual "Federal" water molecules have not yet reached their wells, recharge by Federal water can be responsible for the hydraulic head that makes sufficient quantities of water available to their pumps. The magnitude of uncontrolled conversions over the 25 year period of the contracts is extremely difficult to predict with precision. Based on recent trends, however, it is reasonable to expect that interrelated uncontrolled conversions will take place with detectable effects.

For example, we can roughly estimate future vernal pool habitat loss using Holland's data on recent trends, as detailed in the section on Environmental Baseline, above. As of 1997, there were 408,678 acres of remaining vernal pool habitat in Fresno, Kern, Madera, Merced and Tulare Counties. Using the average of 0.7 percent loss per year for these five counties (Holland 1998), by 2026, there would be 16.1 percent or 65,800 acres of further loss in vernal pool habitats. We anticipate that the commitments by Reclamation and applicants detailed in the Description of the Proposed Action, above, will greatly reduce the amount of this conversion and loss directly attributable to uses of the proposed contract water, and work toward minimizing and partially offsetting the impacts of unauthorized losses since the 1991 biological opinion. However, there may still be interrelated conversions not addressed by Reclamation and contractors based on groundwater recharge by federal water applications. We have not been able to quantify what proportion of groundwater-supplied conversions are interrelated effects as opposed to unrelated,

cumulative effects. As a first approximation we assume that all groundwater-supplied conversions within contracting districts are interrelated, and all groundwater-supplied conversions within 2 miles of a contracting district are interrelated with the proposed action.

Table 4.2 details land uses outside but within two miles of Friant and Cross-Valley service areas, based on data and analysis provided by Reclamation that was in turn based on satellite imagery dating from 1993 to 1998 (Appendix E). Of 2.5 million acres in this surrounding zone, 564,000 acres (23 percent of non-inundated area) are or have recently been in uses of moderate to high value to one or more listed species. Rangeland of various types (448,000 acres) accounts for most of the moderate to high value area. Considerable amounts of the area categorized as rangeland also support vernal pool ecosystems. Non-forested wetlands contribute 7,000 acres. Acreage of forest lands is mostly east and uphill, but downwind, from the project area.

We consider habitats of value to listed species within two miles of contracting districts to be vulnerable to two forms of habitat conversion resulting from federal water deliveries: annexation into contracting districts, and conversions supported by groundwater recharge. We assume that the Districts' commitment to prevent federal water being delivered to converted lands and the Reclamation's authority to review annexations will be effective in preventing conversion and annexation of listed species habitat or critical habitat without separate section 7 review. We anticipate conversions supported by groundwater recharge will follow recent trends as analyzed above, i.e., on the order of 10-20 percent loss of remaining habitats over the 25 year period. Some such conversions may undergo independent processes to comply with the Act, either section 7 or section 10. In addition, based on recent experience, we cannot ignore the likelihood that some interrelated conversions will take place without endangered species review or compliance.

Table 4.2 -- Land Use Within Two Miles of			
Friant or Cross-Valley Service Areas			
GIS Code	LAND USE	Frequency (# of polygons)	AREA (acres)
LOWER HABITAT VALUE/CONVERTED AREAS:			
10	Urban or Built-up Land	14	1,443
11	Residential	218	25,397
12	Commercial and Services	297	25,161
13	Industrial	174	12,932
15	Industrial and Commercial Complexes	1	22
16	Mixed Urban or Built-up Land	724	120,344
17	Other Built-up Land	320	14,914
18	Urban landscaped areas	97	5,180
21	Cropland and Pasture	1675	794,217
23	Confined Feeding Operations	484	18,598
Subtotal:			1,018,208
VARIABLE VALUE--SUBSTANTIAL TO LOW :			
14	Transportation; Communications and Utilities	78	10,652
19	Urban vacant; unpaved	1	129
22	Orchards; Groves; Vineyards;	1159	848,567
26	New lands being prepared for crop production	4	309
70	Barren Land	2	398
75	Strip Mines; Quarries; and Gravel Pits	5	447
76	Transitional Areas	4	447
77	Mixed Barren Land	1	376
Subtotal:			861,326
MODERATE TO HIGH HABITAT VALUE:			
25	Idle farmland	405	29,557
30	Rangeland	1060	178,431
31	Rangeland, Herbaceous	257	260,025
32	Rangeland, Shrub and Brush	19	9,271
41	Deciduous Forest Land	63	61,482
42	Evergreen Forest Land	2	17,078
61	Forested Wetlands	21	1,028
62	Nonforested Wetlands	102	7,007
73	Sandy Areas other than Beaches	2	487
Subtotal:			564,364
TOTAL non-water area:			2,443,898

WATER:			
50, 53, 55	Water, Reservoirs	205	20,584

Some examples of unreviewed conversions with documented or likely effects on listed species in and around the proposed contract areas have come to our attention. A few of these are briefly summarized below.

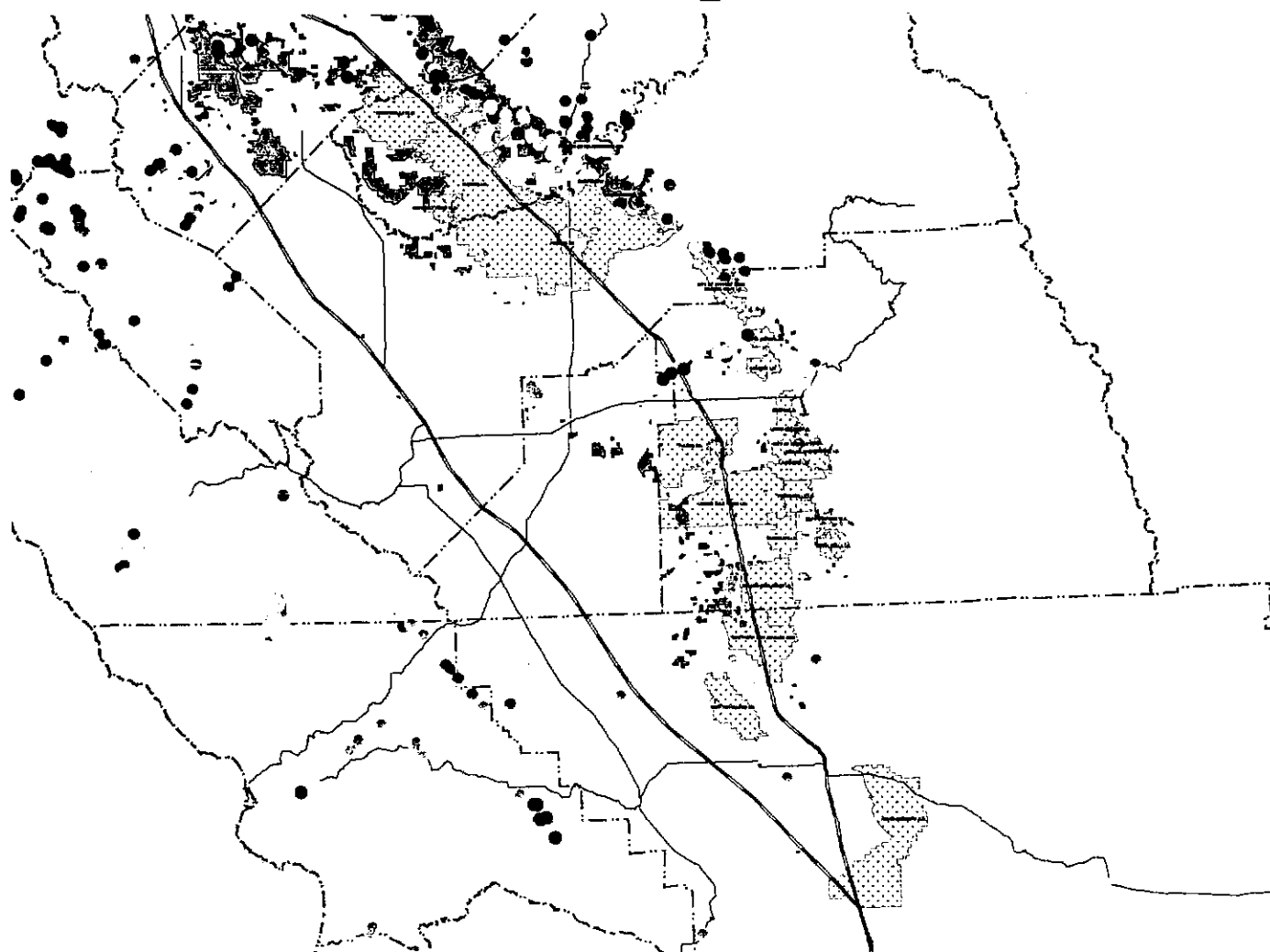
Lower Tule ID Destruction of Valley Elderberry Longhorn Beetle Habitat -- In February of 2000, this district re-contoured the bed of the Tule River over a distance of about 10 miles, from Porterville downstream. The district used bulldozers and other heavy equipment to remove all vegetation from the bottom and sides of the channel, and to shape the channel into a uniform cross-section. This action occurred in an area supporting elderberry shrubs and documented to support the threatened beetle. Local volunteers who helped mark shrubs *before the re-contouring* estimated that several hundred elderberry bushes had been destroyed. This work was done without incidental take authorization from the Service, and reportedly without Clean Water Act permits. The effects have not been compensated to date. The district stated that it conducted a similar operation in 1999 on the 10 miles of the riverbed below the section impacted in 2000. The Service considers these actions interrelated with Reclamation's action, since they were performed by one of the contracting districts, which likely would not exist without federal water deliveries. We have no information that allows us to estimate the extent of future similar interrelated actions by this and other districts.

Alpaugh ID, Conversion of Adjacent Lands -- Sometime in the last half of 1999 or early 2000, approximately 800 acres of natural habitat used by blunt-nosed leopard lizards, kit fox, and perhaps other listed species was plowed and disced. The converted land was adjacent to North Pintail Slough, a multi-partner project with some agricultural benefits and some waterfowl benefits, which connects to Alpaugh facilities. The adjacent landowner(s) appear to have converted the land in anticipation of new availability of water. This conversion took place without an incidental take permit and the effects have not been compensated to date. The area converted was *identified in the Upland Species Recovery Plan* as an important linkage area for listed species and a priority habitat protection area for blunt-nosed leopard lizards.

Holland data -- We examined Holland's (1998) GIS mapping, which showed remaining vernal pool habitats based on July 1997 aerial photos as well as areas converted from habitat since previous photos taken at dates from 1987 to 1994. More than 2000 acres of habitat was converted within contract service areas, notably in Chowchilla WD, with lesser amounts in Madera ID, Tulare ID, Lower Tule River ID, and Delano-Earlimart ID (Figure 4.1). There was also a roughly similar amount of vernal pool habitat destruction outside mapped district boundaries, often directly adjacent to district lands. An unknown portion of these conversions may have taken place prior to the listing of four vernal pool crustacean species in 1994. However, this habitat is also used by the kit fox, which has been protected since 1967.

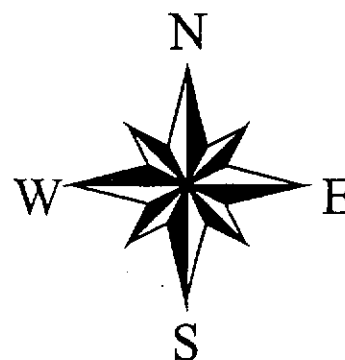
Figure 4.1

Vernal pools



40 0 40 80 Miles

- Lfs.shp
- Cfs.shp
- Vpts.shp
- Vpfs.shp
- Wst.shp
- Cts.shp
- Cl.shp
- Friant28.shp
- Vpools7fc
- Vpools_utm
- County24k_utm



Post-Holland data – Illegal and unreported destruction of vernal pool grasslands poses a significant threat to the vernal pool crustaceans. There are large areas of vernal pool habitats that have been converted without authorization from Reclamation or the Service. Based on Holland (1998) and conversions known to us, we estimate that roughly 10,000 acres of vernal pool grasslands in Fresno, Kern, Madera, Merced, and Tulare counties have been converted without incidental take authorization from 1997-1999. Conversions unknown to us would probably increase this figure substantially. Such conversions are likely to occur in the future given the shortage of personnel in the Service and the Corps to detect and enforce violations. A recent Supreme Court ruling limiting the authority of the Corps to review isolated wetlands is likely to increase the amount of unreported destruction of vernal pool habitats harboring listed vernal pool species.

Many unauthorized conversions may be outside the jurisdiction of Reclamation or the Districts, however, a few are at least within the boundaries of the contract service areas. The following are examples of unauthorized habitat conversions in vernal pool areas that have been identified by the Service in the period from 1997 to 1999. This is far from a complete list:

South San Joaquin MUD	Delano West USGS 7.5' quadrangle	247 acres
Chowchilla WD	Legrand USGS 7.5' quadrangle	456 acres

In other words, there is a historical baseline of habitat conversions either in ignorance or evasion of listed species protection requirements, and lack of knowledge of prior commitments by Reclamation, the Districts, or individual landowners. It is reasonably likely that such conversions will continue at a detectable rate, both within and in the vicinity of the contract service areas.

Habitat fragmentation. Habitat conversions also can fragment remaining habitat and break habitat connectivity needed to preserve dispersal. Dispersal promotes gene flow and metapopulation interchange among different portions of a species range. Loss of habitat area or gene flow and population interchange may reduce the likelihood of survival and recovery of listed species.

For example, the Upland Species Recovery Plan identifies the area along either side of Sandy Mush Road (in Merced County north of Routes 33 and 152) and in the vicinity of the Chowchilla River, in Merced and Fresno Counties east of Highway 99, as an essential linkage or connectivity area for the kit fox (USFWS 1998). There are large areas of grassland, seasonal wetlands, and "idle" or fallow lands along this corridor that make it especially suitable for kit fox dispersal, connecting populations on the east and west edges of the Central Valley (Los Banos and Planada maps, Appendix E). Mapping indicates the northern portions of the Chowchilla WD include some suitable habitats along this corridor, and lands adjacent to Chowchilla WD and Madera WD are vital to the kit fox for habitat and connectivity values. The preservation of a corridor in this area is essential to the continued survival and recovery of the kit fox (USFWS 1998). The Service is aware of unrelated proposals to convert habitat to non-habitat along Sandy Mush Road. Habitat conversion along Sandy Mush Road or in other areas may threaten the continued

existence of the kit fox.

The conversion of vernal pool habitats fragments complexes and isolates vernal pools. Individual pools within a vernal pool complex are mutually interdependent in supporting listed vernal pool species; when a species is extirpated from an individual pool, other pools in the complex may serve as re-colonization sources. The fragmentation of complexes makes listed species vulnerable to loss of genetic variability and related problems of inbreeding and genetic drift, demographic fluctuations due to random variations in birth and death rates, and environmental fluctuations due to variation in predation, competition, disease, food supply, and natural catastrophes (Primack 1998). Fragmentation of vernal pool complexes may threaten the survival and recovery of listed vernal pool species.

These examples highlight common effects of habitat fragmentation on species populations. Such effects apply generally to many species, and we consider that habitat conversions that fragment and reduce the connectivity between remaining pieces of habitat are likely to have such effects on any listed species that use the habitat.

The Upland Species Recovery Plan identifies several target areas for listed species habitat connectivity or linkage. Identified linkage areas relevant to the proposed contracts are:

- along Sandy Mush Road in Merced County (discussed above)
- along Central Valley trough in Merced County
- western Madera County, and northwestern Fresno County southwest of Tranquility
- between natural areas in southwestern Tulare County
- from Kern National Wildlife Refuge to the east side of the Central Valley, surrounding Poso Creek
- from foothills northeast of Bakersfield southwest to Elk Hills along Kern River

Important habitat areas for focal species. Here we briefly highlight the importance of particular areas of remaining habitat to some of the species in this biological opinion. BroadlyHabitat loss or degradation due to conversion in these areas would measurably degrade the conservation status of the species. Further effects of habitat conversion are considered in the Cumulative Effects section, below.

Aleutian Canada goose – This bird winters in the San Joaquin Valley. The Aleutian Canada Goose Recovery Plan (USFWS 1991) estimates that 25,000 to 35,000 acres of migration and wintering habitat will be needed. Wintering and migratory areas are being studied at this time to determine appropriate areas for conservation.

Bakersfield cactus – The species occurs in grassland and rangeland within and near the Arvin-Edison WSD. This species also requires protection of its pollinators, probably native bees. The Upland Species Recovery Plan identifies five populations needed for recovery

that may be threatened by conversion or annexation in the contract area: vicinity of Bena, Sand Ridge, Fuller Acres, Comanche Point, and Wheeler Ridge.

California jewelflower -- This endangered plant has potential to be found within or near Friant and Cross-Valley service areas from Fresno to Kern counties, for example, on non-native or native grasslands and scrub habitats. Seeds of the species are thought to be long-lived in the seed bank. This species also requires protection of its native bee pollinators. The Upland Species Recovery Plan calls for intensive surveys for, and protection of, areas found to be occupied by the jewelflower, notably in valley floor habitats and on the eastern borders of the Central Valley. There are suitable habitats that have not been surveyed both within and near many Friant and Cross-Valley contractors.

Hartweg's golden sunburst -- This endangered annual plant, a member of the sunflower family, occurs on grasslands and in the margins of oak woodlands of the southern Sacramento and San Joaquin Valleys. Hartweg's golden sunburst populations are clustered primarily in two regions of the Central Valley. The southernmost group of populations occurs within or adjacent to the Madera and Fresno Irrigation Districts. Little is known about the pollination ecology of this species; however, protection of native pollinators in surrounding grasslands is recommended. Hartweg's golden sunburst is sometimes associated with the Amador and Rocklin soil series, which are characterized by a series of low mounds interspersed with shallow basins that may pond water during the rainy season. Hartweg's golden sunburst tends to occur on the north- or northeast-facing slopes of the mounds, with the highest plant densities on upper slopes.

Hoover's woolly-star -- This species occurs in alkali sinks and washes within the Fresno Irrigation District and near the Shafter-Wasco Irrigation District. The pollination ecology of the woolly-star has not been investigated; however, other members of this genus are pollinated by native bees and beeflies. The Upland Species Recovery Plan states that monitoring must occur within each metapopulation area to determine trends in the survival of the species.

Keck's checker-mallow -- This endangered plant species occurs and has potential to occur in Fresno and Tulare counties where it is found in open non-native and native grasslands and rangelands. Seeds of the species are thought to be long-lived and may persist in the seedbank for many years. The breeding system of the plant is unknown and may be an obligate out-crossing species requiring generalist and/or host-specific pollinators that require uplands as necessary habitat. Recovery goals for this annual plant species include appropriately timed and targeted surveys and protection of occupied habitat with a 500-foot buffer. Because the species was not rediscovered until 1993, additional surveys are needed in suitable habitats within the range of the species within and near Friant and Cross-Valley contractors, especially east of Fresno.

Kern mallow -- An endangered annual herbaceous plant, the Kern mallow is known only from

southwestern Kern County and was federally listed due to threats from the losses of habitat from agricultural development, oil and gas production, and livestock grazing. The form, density, population size, life stages and reproduction of the species vary greatly with the timing and amount of rainfall. The white-flowered plants of this species occur in openings in saltbush scrub plant communities or on alkaline sandy loam or clay soils, usually with less than 25 percent shrub cover. Insects facilitate pollination of the species and one potential pollinator in Kern County suspected of pollinating the species is a solitary bee, *Diadasia laticauda*. Potential suitable habitats that have not been surveyed occur in the Shafter-Wasco Irrigation District and surrounding areas. Recovery goals for this annual plant species include appropriately timed and targeted surveys and protection of occupied habitat with a 500-foot buffer. Protection of unoccupied habitat within its range also is important recovery goal for population expansion and movement of pollinators and seed dispersers (USFWS 1998).

Palmate-bracted bird's-beak – This species occurs in valley and foothill grasslands and scrub near and possibly within the Madera Irrigation District. The primary pollinators of the species are bumblebees which nest in uplands up to a kilometer (0.6 mile) or more from the plants. The pollinators may also be affected by conversion or annexation of this area which may result in reduced bird's-beak pollination and seed production. The bird's-beak co-occurs in western Madera County with several listed animal species. The Upland Species Recovery Plan identifies protection of the Madera County populations as important for recovery of the species.

San Joaquin adobe sunburst – This threatened annual plant, a member of the sunflower family, occurs on grasslands and in the margins of blue oak woodlands of the San Joaquin Valley. The San Joaquin adobe sunburst prefers clayey soils where the water retention properties are high. Known populations of this species occur within Lower Tule and Fresno Irrigation Districts. Little is known about the pollination ecology of this species; however, protection of native pollinators in surrounding grasslands is recommended.

San Joaquin woolly-threads - Once more broadly distributed in the San Joaquin Valley floor and elsewhere, this endangered annual plant occurs from Bakersfield to Shafter and from north of Lokern to Lost Hills in Kern County and seven other places as far north as Kings County. On the San Joaquin Valley floor, the species is found in non-native grasslands, saltbush scrub, or sandy soils, occupying microhabitats with lower shrub cover. Seed dispersal agents are unknown and possible candidates include wind, water, and animals. In the Alpaugh, Atwell, and Fresno Irrigation Districts, recovery goals include protecting self-sustaining populations in areas representative of the former topographic and geographic range of the species in a variety of appropriate natural communities. Another recovery goal is to protect unoccupied habitat within metapopulations to allow for population fluctuations with rainfall and to facilitate connectivity for seed dispersal. Buffer zones of no less than 500 feet beyond potential and occupied habitats are needed to reduce external influences and allow population

expansion.

Blunt-nosed leopard lizard – Broadly distributed but uncommon in most localities, this endangered lizard may occur in grassland, rangeland or scrub within or near almost any of the service areas below 2,600 feet in elevation. Often co-occurs with San Joaquin kit fox. The Upland Species Recovery Plan explicitly calls for protection and beneficial management of habitats of the species in western Madera County (vicinity of Madera and Gravelly Ford districts) and 6,000 acres in the Pixley-Allensworth area, Tulare, Kern and Kings counties (vicinity of Alpaugh, Atwell Island, Pixley, Southern San Joaquin, and Delano-Earlimart districts).

Buena Vista Lake Shrew – This highly endangered species is found in riparian areas. One important location is on the edge of the Arvin-Edison WSD. In addition to habitat, constant water supply is crucial for the survival of this species, so any changes in hydrological regimen would be catastrophic.

California condor – The condor forages on the edges of the Valley floor in grassland, rangeland, and scrub. In the near future condors will probably be seen in the Arvin-Edison WSD, and later might be found in the Ivanhoe ID, Exeter ID, Lewis Creek WD, and the Lindmore ID, which are all adjacent to designated critical habitat (41 FR September 24, 1976).

Fresno kangaroo rat and designated critical habitat – Any remaining populations yet to be discovered of this critically endangered species will be crucial to its survival and recovery. Potential habitat for the species may occur within and adjacent to the western portions of the Fresno, Madera, Chowchilla, Lower Tule River, and Tulare IDs and northern portions of Gravelly Ford ID. The Upland Species Recovery Plan gives high priority to surveying a block of potential habitat west of and possibly partially within Madera and Gravelly Ford IDs. Critical habitat designated for the species lies about 7 miles west of Fresno ID. Appropriate habitat management of protected lands for Fresno kangaroo rat survival is also urgently needed. Lack of vegetation management on some preserved lands likely contributed to the species' decline.

Giant kangaroo rat – The species occurs in certain areas of the San Joaquin Valley; the closest occurrence to the contract area is about 10 miles west of the Fresno ID. Areas identified for protection are on the west side of the San Joaquin Valley outside the Friant and Cross Canal Service areas.

San Joaquin kit fox – The species occurs in scrub, grassland, rangeland, and some agricultural land throughout the Friant and Cross Valley Service Areas. The Upland Species Recovery Plan explicitly calls for protection and beneficial management of habitats for the species in several locations within the Friant and Cross Valley Service Areas. Two satellite populations require protection: the population in Western Madera County and Merced County; and the southeast Valley floor in Tulare and Kern Counties, including

the Pixley-Allensworth area. Corridors between these satellite populations and other populations must be maintained. One corridor runs north-south on the east side of the San Joaquin Valley from Arvin-Edison WSD to north of the Friant and Cross Valley Service Areas. The Chowchilla Canal Linkage, the Sandy Mush Road Linkage, and the Western Fresno County Linkage run across portions of the Gravelly Ford WD, and the Madera ID. The Highway 43 Linkage in Tulare County runs between the Kern County border at the Allensworth Natural Area to public land directly west of Tipton, within the Lower Tule River ID, and Pixley ID. The Poso Creek and Garces Highway Linkages from Highway 66 to the Kern NWR run across the Alpaugh ID and the South San Joaquin MUD.

Tipton kangaroo rat – The species may occur in grassland, rangeland or scrub in or near the Arvin-Edison WSD, Pixley ID, Alpaugh ID, Lower Tule River ID, Styro-Tek Inc., and the South San Joaquin MUD. The Upland Species Recovery Plan calls for protection of about 5,000 acres in the Pixley-Allensworth area and to manage the area so that it is contiguously occupied.

Vernal pool species -- Here we lump strategies for conserving the listed vernal pool species addressed in this biological opinion: (1) permanently protecting and managing substantial area of vernal pool complexes, including large, high quality complexes that can sustain large populations, (2) protecting habitats across a wide geographic range, and (3) protecting habitats belonging to a range of vernal pool ecosystem types. The protection of larger complexes will ensure preservation of ecosystem level processes important to species survival, and will protect species from local extinction. Protection distributed across geographic regions and vernal pool types will preserve genetically and ecologically distinct populations, and buffer the species against catastrophic events.

There are numerous opportunities to protect vernal pool habitats within the Friant and Cross Valley service areas. The six counties that contain the Friant and Cross Valley contract service areas contain approximately half the remaining vernal pool landscapes and some of the largest intact complexes in California. A generalized mapping of vernal pool habitats is shown in Figure 4.1. Relatively little vernal pool habitat for listed species currently is protected within or near the service areas. Protection efforts for vernal pools should focus first on vernal pool habitats in the southeastern corner of Merced County near the Chowchilla WD, along the Madera Canal in Madera County, along the Friant-Kern Canal in and near the northeast portion of the Fresno ID, west of and possibly within portions of the Madera ID/north of Gravelly Ford ID in western Madera County, and southwestern Tulare County including Pixley ID. The latter two areas may have relatively uncommon low terrace pools that would contribute to the diversity of vernal pool ecosystem types preserved.

Pesticide use. An interrelated effect of Federal water deliveries to Friant and Cross-Valley contractors is the use of pesticides, including insecticides, acaricides, herbicides, fungicides, and other chemicals, on crops grown benefitting from Federal water. Reclamation does not control

pesticide use, but the Service must consider all interrelated and interdependent effects. Fresno, Kern, Tulare, and Madera counties, the principal counties of Friant and Cross-Valley deliveries, rank 1, 2, 3, and 6 statewide, respectively, in total pesticide applications. Cumulatively, 87 million pounds of pesticides (active ingredients) were applied within these four counties in 1999 (California Department of Pesticide Regulation).

A recent study by the U. S. Geological Survey (USGS) suggested organophosphate pesticides from southern Central Valley agricultural areas are contributing to the decline of amphibian populations in the Sierra Nevada. These pesticides kill pests by inhibiting cholinesterase, a vital cellular enzyme in all animals. The USGS scientists found pesticide residues (chlorpyrifos and diazinon) in adults and tadpoles and reduced cholinesterase activity in tadpoles of Pacific tree frog from several Sierra locations, and that cholinesterase activity was significantly lower in the mountains east of the San Joaquin Valley compared with similar sites farther north and east of the Sacramento Valley, where agricultural activity is less extensive. They also found that cholinesterase activity decreased from coastal populations eastward to the mountains.

The only federally listed amphibian that may occur down prevailing winds from the Friant and Cross-Valley vicinity is the California red-legged frog. Red-legged frogs may still occur in isolated populations in the hills east of the contract service areas. A sighting of the species was reported in 1988 near Glennville (northern Kern County). There is no proposed critical habitat for the species in the area, and the draft recovery plan for the species does not identify essential habitat or populations in the area. Since listing of the species in 1996, three previously unknown populations have been found in the Sierra Nevada, due to increased attention and surveys. The Service considers it reasonably likely that one or more populations of red-legged frogs exist downwind of the proposed service areas. No evidence concerning effects of agricultural pesticides on such populations is available.

For the most part, the contract service area are south and east of proposed critical habitats for the California red-legged frog (65 FR 54892). However, there is a core population of red-legged frogs east of Arvin-Edison Water District in Tejon and El Paso Creeks (US FWS 2000). The proposed project would not directly impact these populations as these sites are upstream of the service area. However, the increased water delivery to the area could create favorable habitat (e.g. irrigation ponds, ditches, and canals) for the introduced bullfrogs. The bullfrog have a competitive advantage over California red-legged frog because of their larger size, generalized food habits, and extended breeding season (US FWS 2000), and have been know to prey upon red-legged frogs. Researchers have repeated noted the decline and eventual disappearance of California red-legged frogs once bullfrogs become established (Barry 1992, Hunt 1993). The distance between Tejon and El Paso Creeks to the Arvin-Edison water district is only 3 miles in some areas, and can be easily transversed by bullfrogs in wet years.

Other, non-listed amphibians of conservation concern occur in the Sierra Nevada above the proposed contracts vicinity. Mountain yellow-legged frog and Yosemite toad occur there and we have found that there is substantial information supporting the need to list these species as threatened or endangered (65 FR 60603, 65 FR 60607). The California tiger salamander, a

candidate species, occurs at lower elevations in the contracts vicinity. The USGS study is cause for concern about the effects of pesticides on the tiger salamander, mountain yellow-legged frog and Yosemite toad. No studies specific to the effects of pesticides on these species in the contracts vicinity are yet available.

At present we have no information concerning effects of Central Valley pesticide use on other listed vertebrates or plants found in the Sierra Nevada, such as the bald eagle or Little Kern golden trout. Little Kern golden trout and its designated critical habitat (50 CFR 17.95(e)) occur in the Little Kern River about 35 miles east of the city of Visalia, in Tulare County. Gill-breathing vertebrates like fish and amphibian larvae are generally more sensitive to pesticides in water than other vertebrates. However we have no information regarding pesticide effects on Little Kern River golden trout.

When surface water flows from the northern Friant contract areas reach the lower San Joaquin River and the Sacramento-San Joaquin Delta (Delta), they have potential to contribute to pesticide contamination of waters inhabited by delta smelt and Sacramento splittail. Other impacts include contamination of the remaining spawning habitat and restricting access to spawning habitat in the San Joaquin River. The Delta is designated critical habitat for the delta smelt. For example, the San Joaquin River and the Delta have been designated impaired water bodies by the EPA for chlorpyrifos and diazinon, two general-use organophosphate pesticides that are very widely applied, and for "Group A pesticides" and "unknown toxicity". Preliminary data for 1999 indicate that a total of 800,000 pounds of chlorpyrifos and 190,000 pounds of diazinon (active ingredients) was used on orchards, row crops, vineyards, and other uses in Fresno, Kern, Madera and Tulare counties (California Department of Pesticide Regulation data). The problem is compounded by the reduced water flow, which concentrates contaminants. It is believed that the poor water quality is limiting the splittail's use of the San Joaquin River as spawning habitat as they move upstream in years of high flow (USFWS 1996).

Without Federal water deliveries, some farm operations in the area would halt and pesticide use would likely decline. Reclamation memorandum MP-405, ENV-4.00 dated April 29, 1991, estimated that approximately 90 percent of acreage within the Friant service area would go out of agricultural production without contract deliveries. Because of within- and outside-service area effects on groundwater recharge and groundwater levels, it is likely that Federal water deliveries support agriculture on considerably greater acreage than this. If we assume that 90 percent of acreage inside Friant and Cross Valley service areas and 10 percent of acreage within 2 miles of the service areas would go out of production without this Federal water, this corresponds to 1.4 million acres, with a corresponding drop in agricultural pesticide use.

All of the vertebrate species except the tiger salamander mentioned in this section on pesticide effects would have to be impacted by pesticide transport at considerable distance from the target sites of pesticide applications. Tiger salamanders, a candidate species, live closer to application areas and may sometimes be within target areas, e.g. of rangeland applications.

Valley elderberry longhorn beetles also live in close proximity to areas of agricultural pesticide

application associated with contract water deliveries. Barr (1991) documented areas of valley elderberry longhorn beetle habitat in the watersheds of the Chowchilla, Fresno, San Joaquin, Kings, Kaweah, Tule, and Kern Rivers and Caliente Creek, all of which flow through or near contract areas. In her reconnaissance, she was able to confirm occupation by the beetle, which is rarely seen, along the Kaweah and Tule Rivers, and found characteristic exit holes--strong evidence of occupation--at other sites. The species may also occur in other, unsurveyed areas where elderberry shrubs exist.

The beetle and its host plant may be impacted through the application of pesticides used for crop, orchard, vineyard, and rangeland control of insects and weeds. The majority of pesticides used to control insects or mites would adversely affect individuals of the beetle that came in contact with them, through mortality, impaired development, reduced reproductive success, or disruption of normal behavior. Because the beetle often lives in patches of habitat that are narrowly linear and/or small along riparian corridors, it is especially vulnerable to pesticide application or drift from adjacent uses, such as applications to agricultural fields. The range of the species is scattered throughout the great Central Valley of California, one of the most productive agricultural areas of the world. While it would be unlikely that any one pesticide in any one year would completely wipe out all of the populations--or even any one population--of the beetle, the repeated use of pesticides over many years is likely to contribute to progressive reduction and extirpation of populations of the beetle over its range. In 1995, the following chemicals were reported to be used within the same section (square mile) as beetle localities: acephate, aldicarb, azinphos-methyl, carbofuran, chlorpyrifos, endosulfan, naled, parathion, permethrin, S-fenvalerate, and trifluralin. Valley elderberry longhorn beetle locations existed within the same section as more than 60 common crops or uses of pesticides, including vegetable crops, grains and seed crops, vineyards, fruit and nut orchards, forage crops, cotton, pastures, rangeland, nurseries, turf, and uncultivated areas (University of California Statewide Integrated Pest Management Project: SFWO 1999 national pesticide consultation files). Habitat of the beetle also commonly contains or occurs adjacent to seasonal or permanent wetlands and may be targeted for mosquito control. The SFWO has previously recommended a finding of jeopardy to the valley elderberry longhorn beetle for the registration of five pesticides consulted on by the EPA that are used in the four-county area (Fresno, Kern, Tulare and Madera): acephate, chlorpyrifos, naled, permethrin, and esfenvalerate (S-fenvalerate). Acephate and permethrin are heavily used in the four-county area, and esfenvalerate is commonly used. Naled is heavily used on cotton in Fresno County, and is moderately used elsewhere. Many other pesticides in common usage in the area--some of them related in their mode of action and effects to the five above--have never been consulted on by EPA or fully evaluated by the Service.

The beetle would be most vulnerable to pesticides from March 1 through June 30, when adults, eggs, and first instar larvae could be exposed outside of the elderberry pith. This is also a high period of growth and activity for many crops and pest species, demanding pesticide use. During the remainder of the year, valley elderberry longhorn beetle larvae and pupae would be inside elderberry stems and relatively protected, although feeding larvae might be vulnerable to plant-systemic pesticides.

Additionally, the beetle may be indirectly affected by herbicides affecting their host elderberry shrubs, and lethal or sublethal effects of pesticide use on some pollinators of elderberry shrubs. Such effects could be mediated through reduced survival, growth, or seed production resulting in lowered availability of elderberry shrubs as food for the beetle. However, the guild of elderberry pollinators is large and the plants are self-compatible, so pollinator-mediated effects are judged to be undetectable. Herbicide usage likely affects some beetles but habitat conversion and vegetation clearing are predominantly responsible for losses of host plant availability.

Vernal pool species are highly sensitive to chemistry of their habitats. Since the primary source of water in a vernal pool is precipitation and runoff, many of the organisms endemic to vernal pools are exposed to a wide variety of potentially toxic chemicals during their short (less than 6 months) life cycles. Pesticide use in nearby lands can sheet flow or drift to vernal pools. The ephemeral nature of vernal pools may enhance concentrations of such chemicals during the dry-down phase in late spring. In addition, some compounds do not degrade in a season, resulting in long term accumulation (Cahill et al, 2000). Ultimately, the deposition and concentration of agrochemicals in vernal pools may represent a serious risk to the resident threatened and endangered species.

Contamination of vernal pools from adjacent areas may injure or kill vernal pool crustaceans. Toxic chemicals, such as petroleum products, pesticides, fertilizers, and herbicides, may enter into vernal pool habitats. In San Joaquin Valley, broad spectrum pesticides and herbicides are commonly used for both agricultural and residential purposes to control a diverse array of pests and noxious weeds. Some pesticides, such as the commonly applied organophosphates diazinon and chlorpyrifos remain or volatilize in the atmosphere and are transported and redeposited throughout the region. Several studies have demonstrated that potentially toxic diazinon levels exist, travel in, and deposit out of mist and rain droplets.

Effects on listed species of pesticide use unrelated to the contract water deliveries are considered in the Cumulative Effects section, below.

Fertilizers. The Delta has been designated as an impaired water body by the EPA for organic enrichment and dissolved oxygen. Much of this excess organic loading and oxygen depletion results from fertilizers applied to agricultural lands in watersheds running into the Delta, sometimes including portions of the proposed contract service areas. Fertilizer applications in the contract service areas and in areas of agriculture supported by groundwater recharge from Federal water deliveries is interrelated with the proposed contracts, because in the absence of contract deliveries it is likely that acreage in agricultural production would decline by approximately 90 percent (see above), with a corresponding decline in fertilizer applications.

Nutrients from fertilizers may have a variety of effects in aquatic ecosystems, including algal blooms, increased biological oxygen demand (sometimes to the extent of anoxic conditions), and altered planktonic, benthic, and fish communities. The effects need not be uniformly negative; for example, a fish like the delta smelt that eats algae could benefit from increased algal productivity. Such hypothetical benefits have not been demonstrated for the smelt, and must bear

the caveat that blooms of inedible or toxic algal species or blooms that alter water chemistry or aquatic communities can have direct or indirect adverse effects even on herbivorous fish. Effects of organic loading on a benthic-feeding species like Sacramento splittail are similarly ambiguous in the absence of focused studies. Dissolved oxygen depletion is likely to have negative effects on both species. We cannot quantify at this time the degree to which fertilizer applications interrelated with Federal water deliveries contribute to modification of the Delta and other listed fish habitat.

Fertilizers can directly adversely affect amphibians such as the California tiger salamander, a candidate species. Runoff into ponds or direct application to ponds or upland areas where salamanders are active may result in mortality and sub-lethal effects (Schneeweiss and Schneeweiss 1997).

Fertilizer input can lead to eutrophication of vernal pools, which can kill vernal pools species by reducing the concentration of dissolved oxygen (Rogers 1998).

An additional effect of fertilizer is application of toxic chemicals in fertilizers. For the last few decades, fertilizer manufacturers routinely have been adding undisclosed amounts of toxic waste to farm and home fertilizers sold in California. These companies buy toxic waste from industrial facilities to obtain low-cost plant nutrients, such as zinc or iron. However, sources of these low-cost plant nutrients are often highly contaminated with persistent toxic chemicals, including heavy metals and dioxins. More than 1/6th of the commercial fertilizers tested by the California Department of Food and Agriculture between 1994 and 1998 (n=250) exceeded State of California hazardous waste criteria for heavy metals including lead, arsenic and cadmium. Mercury was also a common contaminant. Tests of a widely used home fertilizer sold throughout California (Ironite) uniformly exceeded State of California criteria for classification as hazardous waste (Kaplan et al., 1999).

Between 1990 and 1995, California fertilizer makers and farms received nearly 38 million pounds of toxic waste, making California the U.S. state importing the most toxic waste. Fertilizer manufacturers use smokestack ash from steel mills, air pollution scrubber brine and other industrial byproducts as the raw materials for a substantial portion of the nation's fertilizers. The resulting waste-derived fertilizers typically contain high levels of toxic materials, such as dioxin and heavy metals (EWG/CALPIRG 1998).

According to a risk assessment commissioned by the California Department of Food and Agriculture, the regular use of contaminated fertilizers will dramatically increase levels of heavy metals in farm soil (Foster and Wheeler, 1998). Because heavy metals are elements and cannot biodegrade, and dioxins are extremely resistant to decomposition, repeated dispersal of these contaminants in fertilizers onto farm fields ultimately is likely to lead to accumulation of much higher levels of contamination than result from a single application. At present, fertilizers are exempted from many legal requirements relating to toxic wastes, and there is no way a buyer of fertilizer can know the amounts of the toxic ingredients because fertilizer labeling requirements do not require disclosure of toxic ingredients.

It is unknown what the effect of repeated application of fertilizers containing hazardous waste levels of heavy metals and other contaminants will have on listed species. However, some adverse environmental effects appear likely to species living on the lands receiving these fertilizer applications, adjacent lands, and waterways receiving runoff from these lands. At present, for example, we are aware that increased levels of mercury would be of particular concern for species that may be exposed, including aquatic species. We are not currently aware of any focused studies of such effects.

Other effects. Vernal pools may be degraded by farming or development activities that occur in, adjacent to, or near the contract service areas. Upland activities that may disturb vernal pools include, but are not limited to, trenching, grading, scraping, off-road vehicles, over-stocking of livestock, discing, plowing, and deep-ripping. These construction or cultivation activities may cause erosion and siltation of vernal pools. Water diversions, ditching, draining, or irrigation can divert water from or to vernal pools, changing the depth and duration of inundation and potentially the temperature and water chemistry of the pool. Such changes are likely to interfere with vernal pool species reproductive cycles, because their biology is precisely adapted to ambient hydrological, physical, and chemical conditions and cues. Construction of roads near vernal pools may disrupt hydrology or increase runoff of sediments and contaminants.

Habitats of other listed species may similarly be degraded by discing, grading, off-road vehicle use, and other activities often associated with and occurring near urban and agricultural land uses.

Water Diversions. In-stream flow below Friant Dam is controlled by releases from the Dam, with minor contributions from agricultural and urban return flows. Historically, releases from Friant Dam are limited to those required to satisfy downstream water right. The annual entitlement to Friant water district is 2,141,475 acre-feet, 25 percent more than the annual average runoff from upstream drainage of 1.7 million acre-feet (Reclamation 1998). In the reach between Friant Dam and the Gravelly Ford, the in stream flow has been significantly curtailed such that the river bed dries out intermittently. This curtailment of stream flow has led to the encroachment of human development and agriculture within the former floodplain of the River. Riparian habitats that had previously flooded too frequently to sustain permanent agriculture or residence were now subject to developmental pressures (Service 1991). It is estimated that only 5.8 percent of riparian habitat along the San Joaquin remains in the mid-1980's. The acreage is likely to be much less today (Service 1998).

With the renewal of the water contracts for the next 25 years, in-stream flow would continue to be curtailed, enabling the development and conversion of riparian habitat within this reach of the River. This conversion would constitute an irreversible loss as it is nearly impossible to restore river flow once human development occurs in the flood plain. Listed and candidate species associated with riparian habitats in the San Joaquin Valley include: Buena Vista lake shrew, giant garter snake, least Bell's vireo, riparian brush rabbit, riparian woodrat, southwest willow flycatcher, and valley elderberry longhorn beetle. The giant garter snake and valley elderberry

longhorn beetle are widely distributed throughout the valley. Although the loss of additional riparian habitat along San Joaquin River would adversely impact these species, it would not jeopardize their recovery. The current distributions of the remaining species are outside the contract service areas, thus the proposed action would not directly impact these species. The least Bell's vireo has sufficient populations in their southern range to sustain the species in the foreseeable future. However, restoration of riparian habitat in the San Joaquin Valley was identified as a critical task to recovery (Service 1998a, Task 1.123).

Buena Vista lake shrew, riparian brush rabbit, riparian woodrat, and southwest willow flycatcher are known from only one or two localities, and are facing eminent extinction if trends are not reversed. Thus, restoration of riparian habitat along the Central Valley, their historical habitat, is critical to the recovery of these species. In past years, Reclamation has been working with the Service, ESRP and other partners to initiate recovery efforts for these riparian species. Projects included censusing riparian brush rabbit and riparian woodrat populations in Caswell Memorial State Park, investigating protection of the Park, and working to establish an experimental population of riparian brush rabbit on Reclamation owned land along Kings River in Fresno County. Friant Water Users Authority has also been cooperating with Natural Resource Defense Council to conduct a feasibility study to restore natural hydrological and ecological function to the San Joaquin River. A summary of recovery projects implemented by Reclamation, Friant Water Users Authority, and ESRP are attached as Appendix C.

The renewal of contract would also adversely impact Sacramento splittail and delta smelt. The decline of these species are largely attributed to the Central Valley Project and the State Water Project (USFWS 1996). The Sacramento splittail is a freshwater species that historically occurred in San Joaquin and Sacramento Rivers and the Delta. The delta smelt is an estuary species found in the Delta. The diversion of water from the San Joaquin and Sacramento Rivers and ultimately the Delta has drastically reduced the amount of spawning habitat for both species. The long term renewal of the Friant and Cross Valley contracts and continued diversion of 2,269,775 acre feet of water from the San Joaquin River would slow down the recovery of these species by reducing overflow in the Delta needed to create spawning habitat. However, commitments made by Reclamation in the section 7 consultation on long term operation of CVP and SWP (1-1-94-F-70) to provide base flow to the San Joaquin River should allow eventual recovery of these species.

Effects of Conservation Measures/Commitments. These measures or commitments are intended to reduce, ameliorate, or reverse effects of Friant and Cross Valley water diversions and deliveries on listed and proposed species. In our effects analysis we have assumed that these measures will be effective. The measures also establish an Adaptive Management committee to address any unforeseen inadequacies or failures of the conservation measures.

Cumulative Effects

Cumulative effects are those effects of future State, local, or private actions on endangered and

threatened species or critical habitat that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Numerous activities continue to eliminate habitat for listed and proposed threatened and endangered species in the Central Valley. Habitat loss and degradation affecting both animals and plants continues as a result of urbanization, oil and gas development, road and utility right-of-way management, flood control projects, overgrazing by livestock, and continuing agricultural expansion. Listed and proposed animal species are also affected by poisoning, shooting, increased predation associated with human development, and reduction of food sources. All of these nonfederal activities are expected to continue to adversely affect listed and proposed species in the Central Valley.

Cumulative effects on many species are severe enough to substantially reduce the likelihood of long-term survival and recovery of these species. Ongoing operation of the CVP, including the Friant and Cross-Valley contracts, contributes to the threat to these species. Reclamation's ESA compliance strategy is intended to minimize further losses within the CVP service areas and to offset impacts from ongoing CVP operations.

Many of the effects discussed above as indirect or interrelated effects also occur unrelated to the proposed action, and are considered in the category of cumulative effects. An example is pesticide use in the vicinity of the contract service areas but not dependent on the contracts. Most pesticides have not been consulted on with the Service by EPA. Modes of pesticide effects on listed species were discussed above. Pesticides of all types, including herbicides, are extremely widely used in California, particularly in the San Joaquin Valley. Chemicals applied nearby may drift or run off into contact with listed species. Certain pesticides are registered by the EPA for use on rangelands, and these may be sprayed directly on vernal pools, tiger salamander habitat, and upland species habitat. Pesticides are sometimes applied directly to pools, including vernal pools, for mosquito abatement.

A particular example of a cumulative effect of pesticide use that is relatively new to the area is glassy-winged sharpshooter control. Elderberry shrubs, the food and host plant of the valley elderberry longhorn beetle, has been identified as a refuge for glassy winged sharpshooter, a vector for Pierce's disease of grapes (California Agriculture 1997). Control of refugial vegetation has been suggested as a means of controlling the disease. Private or state efforts that eradicated elderberry shrubs could have serious adverse effects on the valley elderberry longhorn beetle.

Fertilizer, water quality, and contaminant effects were discussed above. *Similar effects but greater in areal extent and magnitude occur outside and unrelated to project water deliveries.*

Water diversions not under federal control cumulatively affect riparian species in the action area. Private and state diversions reduce streamflow and groundwater levels in riparian habitats in the area, with negative effects on listed species that use riparian zones.

Illegal and unreported destruction of their habitat poses a significant threat to many of the listed species in this consultation throughout much of their ranges. Discussion and examples were provided in the subsection above titled "Habitat conversions not addressed in the Project Description." A substantial portion of such conversions are unrelated to the proposed action and will not be reported for section 7 consultation, so these effects are cumulative to the proposed action.

Additional discussion of cumulative effects encompassing the contract service areas was provided in the November 21, 2000, programmatic long-term contracts biological opinion.

5. Conclusion

After reviewing the current status of the species considered in this biological opinion; the environmental baseline; the effects of the proposed renewal of the Friant and Cross Valley Division water service contracts; the effects of the conservation measures; and the cumulative effects, the Service has concluded that the proposed action, as described in this opinion, is not likely to jeopardize the following species: Aleutian Canada goose, Bakersfield cactus, bald eagle, blunt-nosed leopard lizard, Buena Vista lake shrew, California condor, California jewelflower, California red-legged frog, California tiger salamander, Colusa grass, Conservancy fairy shrimp, Delta smelt, fleshy owl's-clover, Fresno kangaroo rat, giant garter snake, giant kangaroo rat, Greene's tuctoria, hairy Orcutt grass, Hartweg's golden sunburst, Hoover's spurge, Hoover's wooly star, Keck's checker-mallow, Kern mallow, least Bell's vireo, mountain plover, palmate-bracted bird's-beak, Sacramento splittail, San Joaquin adobe sunburst, San Joaquin kit fox, San Joaquin Valley Orcutt grass, San Joaquin wooly-threads, southwest willow flycatcher, Tipton kangaroo rat, valley elderberry longhorn beetle, vernal pool fairy shrimp, and vernal pool tadpole shrimp, or destruction or adverse modification of critical habitat of California condor, delta smelt, Fresno kangaroo rat, southwestern willow flycatcher, or valley elderberry longhorn beetle. The Service has concluded that the proposed action, described in this opinion, is not likely to adversely affect the bald eagle and California condor.

It was also concluded that, because of their close proximity, historic range and inclusion in future consultation actions, the riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*) should continue to be a focus of conservation efforts for this Proposed Action, if conservation efforts in this Project Description are determined to be expandable to encompass the needs of these species. The SJV Recovery Plan for Upland Species identifies efforts to restore and link riparian habitat, and reintroduce populations of riparian woodrats and brush rabbits as conservation actions needed to recover these species. Effects to these species is germane to the Friant Division and will be analyzed in future tiered consultations relevant to the Friant Division, including but not limited to Surplus Flood Flows Contracts and Implementation of the San Joaquin River Riparian Restoration Program..

This conclusion is based on the assumption that measures in this biological opinion are fully implemented. Actions that are not included in, and consistent with, the project description in this document have not been analyzed for their impacts on the survival and recovery of proposed and listed species.

6. Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of ESA do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that ESA requires a Federal permit for removal or reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State law, including the California Endangered Species Act, or in the course of any violation of a State criminal trespass law.

For this biological opinion, no incidental take is authorized. As discussed in the Introduction of this opinion, the following actions, included in the long-term renewal contracts, are not covered by this opinion. These actions, as listed below, and any other action not described in the Project Description of this biological opinion, will require separate determinations regarding their potential effects on threatened and endangered species and critical habitat pursuant to section 7 and/or section 10 of the ESA.

- Any future assignments of Central Valley Project water involving Friant Division or Cross Valley Unit contractors
- Transfers and/or exchanges involving Friant Division or Cross Valley Unit contractors
- Inclusions and exclusions to Friant Division or Cross Valley Unit contract service area boundaries
- Warren Act contracts
- Surplus Flood Flow Water Contracts
- Future changes in purpose of use from Ag only to Ag/M&I involving Friant Division or Cross Valley Unit contractors
- Any changes in purpose of use

- Operation and Maintenance on Federal and District lands used to convey CVP water and implementation of the agreements to transfer the operations, maintenance, and replacement and certain financial and administrative activities related to various Reclamation facilities and associated works (self funding agreement).
- Operation and Maintenance Plans
- Actions associated with the CVPIA Land Retirement Program in the Cross Valley Division
- Actions associated with the San Joaquin River Restoration Program
- New contracts
- Future contract renewals beyond the year 2026

Reporting Requirements

Reclamation shall notify the Service immediately if dead or injured endangered species are found during implementation of actions or on Reclamation land and must submit a report including date(s), location(s), habitat description, and any corrective measures taken to protect the individual(s) found. If endangered animals are captured, the report shall also include photographs of the individuals, condition of the individual, length of time held, release location, and any other pertinent information.

Reclamation shall meet with the Service's Sacramento Fish and Wildlife Office, Endangered Species Division (ESD) on a quarterly basis, or more frequently as needed, and provide **quarterly** reports to ESD to report on the progress of all commitments in the Description of the Proposed Action and terms and conditions contained in this biological opinion and other biological opinions that address service area effects of the CVP. Reclamation will provide the quarterly reports to ESD in draft format to allow Service review so that changes can be made prior to the final report transmittal to ESD. **The first quarterly status report will be due by March 30, 2001.**

In order to ensure that water deliveries do not exceed historical patterns and amounts as described in the project description, Reclamation shall *report the amounts of water delivered* each year and the proportion of deliveries relative to historic use. The reports shall also include the names and description of all actions which Reclamation has determined to have no effect on listed species, including the number of acres affected, and the land use preceding and subsequent to the action, as of January 1, 1991, for the Friant Division service areas, and January 1, 1995 for Cross Valley Division service areas affected by delivery of CVP water. In addition, Reclamation shall also include plans to compensate habitat losses that did not likely adversely affect listed species, but for which the Service and Reclamation agreed that compensation habitat would be provided through management or acquisition in perpetuity. Reclamation shall transmit their plan for implementation of proposed compensation actions in these reports.

Reclamation shall require the districts to report immediately any information about take or suspected take of listed wildlife species. Reclamation shall immediately notify the Service

within 24 hours of receiving such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. The Service contact person is Assistant Field Supervisor for Endangered Species Program, at (916) 414-6600. Any injured or killed specimens shall be deposited with the Service's Division of Law Enforcement at either 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660; or 197 North Sunnyside Ave., Suite 104, Clovis, California, 93611, (209) 487-5773.

Upon locating a dead, injured, or sick endangered or threatened species specimen, initial notification must be made to the nearest Service Law Enforcement Office (Mr. Scott Pearson, 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660). Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

The U.S. Fish and Wildlife Service Regional Office in Portland, Oregon, must be notified by Reclamation immediately if any dead or sick listed wildlife species is found in or adjacent to pesticide-treated areas. Cause of death or illness, if known, also should be conveyed to this office. The appropriate contact is Richard Hill at (503) 231-6241.

The Service has provided a protocol for the handling of dead, injured, or ill listed species for pesticide analysis. When Reclamation suspects a species has been taken in violation of label restrictions, the incident(s) shall be reported to the U.S. Fish and Wildlife Service, Division of Law Enforcement or their designee in the Region in which the species is found. Instructions for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement (Mr. Scott Pearson, 2800 Cottage Way, Room W-2928, Sacramento, California 95625, (916) 414-6660).

7. Conservation Recommendations

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the ESA, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. The recommendations here relate only to the proposed action and do not necessarily represent complete fulfillment of Reclamations 7(a)(1) responsibilities. The Service recommends that Reclamation:

- a. Implement all programs within CVPIA to be consistent with §7(a)(1) of the ESA.
- b. Operate the CVP in a manner that is consistent with §7(a)(1) of the ESA.
- c. When coordinating with the Service regarding project impacts and effects determinations, include coordination with the Service's Endangered Species Division to assure consistency with §2 and §4 of the ESA.
- d. Provide annual assessments to the Service confirming whether or not the Assumptions included in this Project Description are valid.
- e. In preparing NEPA documents relative to transferring or delivering water out of the CVP, or contributing selenium to the CVP, fully consider §7(d) of the ESA.
- f. Fully implement §3406 of CVPIA prior to delivering or transferring water out of CVP service areas or out of the CVP place-of-use.
- g. Conduct studies for the Central Valley Project with particular reference toward releasing more water to restore riparian habitat and contribute to the recovery of the riparian brush rabbit, riparian woodrat, least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo. The Service will assist in the study design.
- h. Subsequent fulfillment of the Comprehensive Plan requirements under section 3406(c)(1) of the CVPIA, release more water, as needed, from Friant Dam to improve downstream water quality and to the extent necessary to restore high-value habitat for listed species.
- i. Follow the strategy set forth by the Service's Habitat Conservation Division on implementation of 3406(b)(3) and 3408(j).

- j. Provide more education to Reclamation staff at all levels on upholding the ESA and 7(a)(1) responsibilities.
- k. Conduct workshops for Service and Reclamation staff on implementing this biological opinion and on the importance of the concepts of communication, coordination and cooperation that establish the premise of this biological opinion.
- l. Provide outreach to the public and to schools on protecting listed species, establishing safe harbors, forming partnerships that foster conservation, and habitat conservation planning.
- m. Fund studies of groundwater percolation and contaminant levels through the Service or the United States Geological Survey.
- n. Follow ecosystem protection components for the Central Valley and Bay Delta of the Service's Ecoregion Program.
- o. Adopt the Plan of Action prepared by the Service's Habitat Conservation Division and utilize the Request for Consultation Services for implementation of 3406(c)(1).
- p. Evaluate species of concern and their associated habitats to assess possible adverse effects of CVP actions and identify conservation measures that could protect species populations and help avoid the necessity of listing those species under the ESA.
- q. Establish a tracking program for compliance with this opinion and report to the Service any actions which are not consistent with this opinion.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

8. Reinitiation/Closing Statement

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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